

# MIC412 Dual Optical / Thermal PTZ Camera

Bosch Security Systems

**EN** | Installation and Operation Manual



**BOSCH**

# MIC 412 Dual Optical / Thermal PTZ Camera

## Installation and Operation Manual

For the MIC412TI and MIC412TF PTZ camera models

### Chapters

1. Introduction
2. Hardware Installation
3. Power Supply Installation
4. Configuring the MIC412 Camera
5. Technical Specifications



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## Safety Precautions

The following symbols are used throughout this manual please pay careful attention to their meaning.



The lightning flash with an arrowhead symbol within a triangle is intended to alert the user to the presence of non-insulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within a triangle is intended to alert the user to the presence of important safety, operating and maintenance (servicing) instructions in the literature accompanying the appliance.

## Important Safety Instructions



**CAUTION**  
TO REDUCE THE RISK OF ELECTRICAL SHOCK, DISCONNECT POWER SUPPLY BEFORE OPENING THE POWER SUPPLY UNIT.  
POWER DISCONNECT: POWER SUPPLY UNITS HAVE POWER SUPPLIED WHENEVER THE POWER CORD IS INSERTED INTO THE POWER SOURCE.



**WARNING**  
INSTALLATION SHOULD BE CARRIED OUT BY QUALIFIED PERSONNEL IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE, ANSI/NFPA, CANADIAN ELECTRICAL CODE, AND ALL LOCAL COUNTRY CODES.  
BOSCH SECURITY SYSTEMS ACCEPTS NO LIABILITY FOR ANY DAMAGES OR LOSSES CAUSED DUE TO INCORRECT OR IMPROPER INSTALLATION.



### WARNING

INSTALL EXTERNAL INTERCONNECTING CABLES IN ACCORDANCE TO NEC, ANSI/NFPA70 (FOR US APPLICATION) AND CANADIAN ELECTRICAL CODE, PART I, CSA C22.1 (FOR CAN APPLICATION) AND IN ACCORDANCE TO LOCAL COUNTRY CODES FOR ALL OTHER COUNTRIES.  
BRANCH CIRCUIT PROTECTION INCORPORATING A 20 A, 2-POLE LISTED CIRCUIT BREAKER OR BRANCH RATED FUSES ARE REQUIRED AS PART OF THE BUILDING INSTALLATION.  
A READILY ACCESSIBLE 2-POLE DISCONNECT DEVICE WITH A CONTACT SEPARATION OF AT LEAST 3 mm MUST BE INCORPORATED.  
ROUTING OF EXTERNAL WIRING MUST BE DONE THROUGH A PERMANENTLY EARTHED METAL CONDUIT.



### WARNING

THE CAMERA MUST BE MOUNTED DIRECTLY AND PERMANENTLY TO A NON-COMBUSTIBLE SURFACE.



## IMPORTANT SAFETY INSTRUCTIONS

1. Read these instructions
2. Keep these instructions
3. Heed all warnings
4. Follow all instructions
5. Install according to manufacturer's instructions
6. Do not install near any strong heat sources such as furnaces
7. Do not open the camera unit, doing so invalidates the unit's warranty
8. Do not back-drive the pan or tilt axis of the camera. To do so will damage the motor drive gear chain and will invalidate the warranty
9. Do not use caustic or abrasive cleaning products on the unit
10. Do not point the MIC412 camera at the sun. Bosch Security Systems Ltd will not be liable for any damages to cameras which have been directly pointed at the sun
11. In situations where there could be a risk of injury should any part of the assembly become detached for any reason and fall, normal common sense safety precautions should be employed; a strong safety chain between the camera pan shaft and the mounting surface is recommended
12. For transportation please rotate the ball so the window points towards the base, this helps to protect the wiper & windows during transit
13. Ensure that the product case is properly earthed. If the product is likely to be struck by lightning, ensure that earth-bonding connections are made correctly to the mounting base of the unit
14. Use only the power sources indicated in this user guide and ensure that the current rating of the supply cable is adequate for the product
15. Do not stand canted (45°) MIC412's upright as they can be easily knocked over, lay them on their side.



This product complies with the following EC directives:-

EMC Directive (89/336/EC as amended)

Machinery Directive (98/37/EC)

LV Directive (73/23/EC)

RoHS (Restriction of Hazardous Substances) 2002/95/EC

WEEE (Waste Electrical & Electronic Equipment) 2002/96/EC



This equipment contains electrical or electronic components that must be recycled properly to comply with Directive 2002/96/EC of the European Union regarding the disposal of waste electrical and electronic equipment (WEEE). Contact your local supplier for procedures for recycling this equipment.

## Reference

### Glossary of Terms

PTZ	-	Pan/Tilt/Zoom
Bi-phase	-	Bosch Bi-phase telemetry protocol (see pg8)
PSU	-	Power Supply Unit
IR	-	Infra Red
BP3 or 4	-	Bi-phase converter cards for MIC400 range of cameras
STP	-	Shielded Twisted Pair cable

### Glossary of Appendices

Appendix A	-	Sonyset Camera Commands
Appendix B	-	Protocol Preset Codes



## CHAPTER 1

**Introduction**

The MIC412 Dual Optical/Thermal PTZ camera is a high specification, weatherproof, ruggedized, fully functional pan tilt zoom CCTV camera system incorporating a Sony optical camera module paired with a Flir Photon thermal imager. This combination allows for the covert detection of human sized targets at ranges up to 780M in complete darkness or to lesser ranges in adverse weather conditions.

The MIC412 has been designed to offer an extremely reliable, robust and high quality surveillance solution for security applications that demand the very best performance. Precision engineered to exacting standards, the range offers numerous benefits over the use of traditional dome and PTZ cameras and comes with a variety of options in order to offer a best fit solution for virtually any application.

Rated to an industry leading IP67, the compact vandal resistant 6mm thick aluminium camera housing is suitable for installation in the harshest of environments, while the optically perfect flat viewing window and integrated wiper option ensure razor sharp images are captured in even the most demanding conditions.

Brushless motor technology ensures ultra-reliable, whisper quiet operation while groundbreaking resolver technology provides pin-point accuracy and affords the user full 360° continuous rotation pan and an unprecedented 320° tilt control.

A choice of true day/night camera modules, offering up to 36x optical zoom (12x digital), along with a choice of 9hz or 25hz\* thermal imagers coupled with flexible upright or inverted mounting capability, allows the perfect field of view to be achieved every time even in poor conditions.



## MIC412 Camera Versions

This manual covers the installation & operation of the following MIC 412TI and MIC 412TF Dual optical thermal PTZ cameras, briefly described below:-

**MIC 412TI** The MIC 412TI is made from machined and cast aluminium and is then pre-treated and painted with two part epoxy power coat paint in either RAL 9003 (Signal White) or RAL9005 (Jet Black), other colours are available on request.. This unit incorporates a choice of 18x or 36x Day/Night optical camera paired with a 50mm 9Hz Flir Thermal Imager.

**MIC41 2TF** The MIC 412TF camera is made to the same specification as the MIC412TI but fitted with a 25Hz Flir Thermal Imager, the 18x and 36x Day/Night optical camera choices remain.

## MIC 412 Power Supply Unit Versions and Options



**CAUTION:** Only use the specified power supplies with the MIC 412.

Bosch Security Systems have designed a range of power supplies for the MIC412 cameras to cater for a variety of common voltages and provide all the connections needed for power, telemetry and video. The power supply units and options are detailed below. Refer to the *MIC Series Power Supplies Installation Manual*.

For MIC412 cameras only:-

<b>MIC-240PSU-UL</b>	240VAC input Power Supply Unit
<b>MIC-115PSU-UL</b>	115VAC input Power Supply Unit
<b>MIC-24PSU-UL</b>	24 VAC input Power Supply Unit



### **DANGER:** ELECTRICAL SHOCK HAZARD

Ensure the power is disconnected prior to opening the power supply enclosure. Power must be disconnected before replacing any fuse in the MIC PSU.

The MIC power supplies have a separate internal shield covering the power cable input header (HD1).

Only suitably qualified persons should remove this shield and connect the mains power cable, the shield **MUST** be re-fitted and fully secured prior to connecting the power.

The mains supply cable shall have conductors of a maximum size of 12 AWG. A readily accessible disconnect device (circuit breaker) shall be incorporated externally to the equipment. The recommended rating is 15 A.





## MIC 412 Options

Options include the following:-

**Wiper** a rubber wiper blade mounted on a spring loaded arm is available as standard on all MIC412 versions.

**Heater** Two (2) 10w heaters can be fitted to MIC412 versions giving improved low temperature performance down to -30°C.

**Sunshield** A two (2) part plastic sunshield to provide additional protection in sunny climates.

**MIC-WKT** Washer bracket, nozzle and washer pump drive card kit.

**MIC-ALM** 8-input alarm card includes washer pump drive function.

**MIC-BP3** Bosch Bi-phase converter card for power supplies without expansion slots available.

**MIC-BP4** Bosch Bi-phase converter card for power supplies with an expansion slot available.

## Features

The MIC412 series cameras have the following features:

- Brushless Motor Technology for whisper quiet operation.
- Large protocol selection available for easy integration
- Canting option to allow bottom of pole vision
- Choice of 18x or 36x camera modules
- Wide range of mounting options for varied applications
- Optically flat viewing window

## Unpacking



**CAUTION:** Ensure canted (45°) MIC412's are laid on their side; do not stand upright as they are unstable.

**CAUTION:** Take extra care lifting or moving MIC412 units due to their weight.

- Check the exterior of the packaging for visible damage. If any items appear to have been damaged in transit please inform the shipping company.
- Unpack the power supply unit carefully; although ruggedized this is electronic equipment & should be handled with care.
- Do not use if any component appears to be damaged. Please contact Bosch Security Systems Ltd in the event of damaged goods.
- The shipping carton is the best way to transport the unit, save it & all other packaging materials for future use. If the unit must be returned, use the original packing materials.

## Packaging Contents

Please check for the following contents

- MIC412 Installation & Operation manual (this guide)
- Installation & Configuration CD
- Quick start reference sheet
- Nebar Gasket
- MIC412 Dual Optical/Thermal PTZ Camera



## Installation Environment



**CAUTION:** Ensure that the National Electric Code, ANSI/NFPA, Canadian Electric Code, and all local country codes are observed when installing this product. Ensure a strong safety chain is used to secure the MIC412 camera to prevent any danger of dropping the product during installation. Particular care should be taken with MIC412 models due to the additional weight.

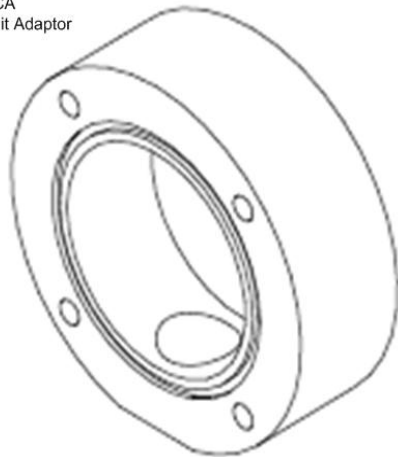
The MIC412 has been designed to be easily installed on a variety of common fittings. Most commonly a dedicated CCTV camera pole is used, the MIC412 will bolt directly to the top of most poles using the industry standard 4 in. (101.6 mm) fitting. Such camera poles provide robust mounting platforms that minimize camera motion and typically have large base cabinets to mount all ancillary equipment such as power supplies.

The MIC412 cameras can also be mounted on lamp post columns using the Pole Mount Bracket (MIC-PMB) however users should be aware that lamp posts can often be subject to movement and are not suitable platforms in all conditions or for all applications.

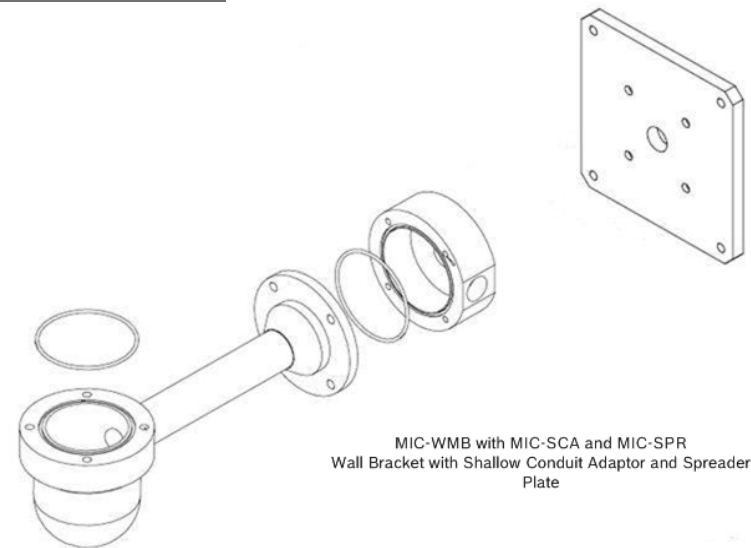
For mounting directly onto buildings Bosch Security Systems manufactures a range of brackets suitable for all typical building installations for upright (90°), canted (45°) or Inverted camera positions.



MIC-SCA  
Shallow Conduit Adaptor

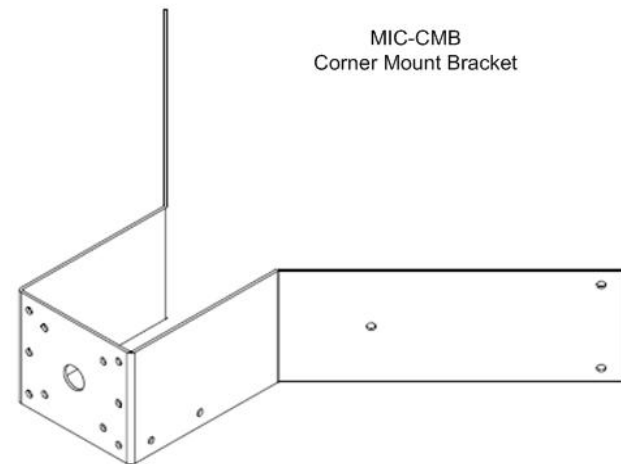


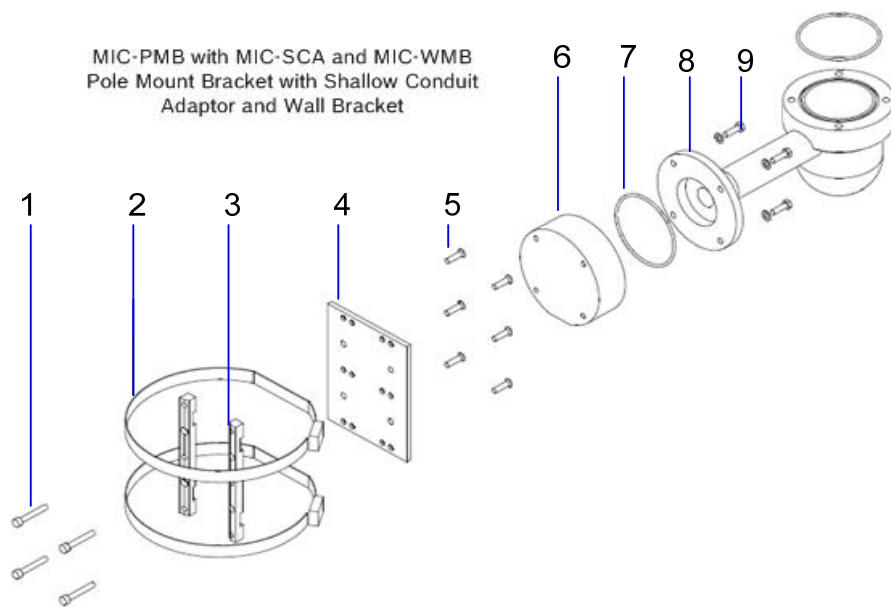
MIC-DCA  
Deep Conduit Adaptor



MIC-WMB with MIC-SCA and MIC-SPR  
Wall Bracket with Shallow Conduit Adaptor and Spreader  
Plate

MIC-CMB  
Corner Mount Bracket





#### Key to MIC-PMB drawing

1. Securing bolts for MIC-SCA
2. 90mm stainless steel pole banding
3. Pole mount bracket blocks
4. Pole mount bracket plate
5. Pole mount block securing bolts
6. Shallow conduit adaptor
7. "O"-ring
8. Wall mount bracket
9. Wall mount bracket securing bolts

#### Associated Equipment and Typical Installations

The robust nature of the MIC412 range of cameras make it ideal for installation in all typical domestic and commercial CCTV applications such as residential homes, shopping centres, commercial premises, military/ government installations, ports & airports to name but a few.

The MIC412's adaptability enables easy integration in a wide variety of mobile and re-deployable installations these have included Lifeboats and other surface/subsurface vessels, Emergency service vehicles, Highways Agency vehicles, Council/Contractor parking enforcement vehicles and Crowd control vehicles.

The MIC412 uses a composite cable to carry all power and telemetry between the camera head and the MIC power supply unit this cable can be a maximum of 25 m long, for installations which require the camera head to be more than 25 m from the power supply then it is recommended that a 2m cable be connected to a junction box from which telemetry; video and power can be broken out into separate cables and appropriate wiring used to extend the distance to suit.

CHAPTER 2 **Hardware Installation**

**CAUTION:** Ensure that the National Electric Code, ANSI/NFPA, Canadian Electric Code, and all local country codes are observed when installing this product. Ensure a strong safety chain is used to secure the MIC 412 camera to prevent any danger of dropping the product during installation. Particular care should be taken with MIC 412 models due to the additional weight.



**CAUTION:** Fasteners are not supplied with the camera since it depends on the material to which it is attached. The material must accommodate a minimum pull out strength of 275 kg (600 lbs.) Fasteners can include wedge anchors, sleeve anchors, single expansion anchors, double expansion anchors, machine screw anchors, or Thru Bolting with a nut. All fasteners must be made of 303(A2) stainless steel, at a minimum, with a diameter of 9 mm (5/16-in). All bolts must fully extend through the mounting surface and be secured with a flat washer, lock washer and a nut. All studs must be anchored to concrete or welded to a steel backing plate. Anchor bolts can be used for blind structures where there is no access to the rear.

**Installation Instructions**

1. Locate the mounting position of the camera so that it cannot be interfered with either intentionally or accidentally.
2. Ensure the mounting surface is capable of supporting the combined weight of the camera and mounting hardware under all expected conditions of load, vibration and temperature.  
The MIC 412 must be secured to one of the following surfaces:
  - Concrete Solid/Cast
  - Concrete Masonry Unit (Concrete Block)
  - Brick (all type)
  - Metal (Steel/Aluminum, minimum 1/8-in. thick)

3. Fit the mounting brackets securely, observing all appropriate safety precautions and local building regulations.
4. Ensure that the mating 12-pin connector is fitted properly in the camera plug. Confirm that the 25 mm connector sleeve on the top of the composite cable is done up tightly (approx. four turns from start of thread engagement).
5. Earth the camera using one of the securing bolts. Only earth the camera at a single point to prevent earth loops and hum bars.
6. M8 x 20mm Stainless steel nuts, bolts and washers should be used to secure the 4 in. PCD camera base to the mounting bracket. An additional Nebar gasket or suitable silicone sealant can be used to ensure a water tight seal between the 4 in. PCD base and mounting surface. Ensure all bolts are securely tightened. Secure all cabling and conduit.



**CAUTION:** If the camera is mounted ball down it is essential that the connector and base area of the camera are completely sealed from water ingress.

**CAUTION:** Any water getting into the connector is liable to cause corrosion to the connector pins leading to unreliable operation of the camera unit.

**CAUTION:** To prevent water penetrating the composite cable connector threads, the 25 mm thread should be sealed at final installation using PTFE tape. Alternatively a suitable sealant may be liberally applied to the thread prior to final tightening.

Refer to the *MIC Series Bracketry Installation Guide* for more information about each MIC mounting option.



### Earthing of the MIC 412 camera

1. The camera module and housing are electrically isolated so the housing should be safety earthed regardless. The safety earth should be a bonding connection to the cameras outside case for example one of the securing bolts.
2. The camera should be earthed at one point only to prevent earth loops & thus hum bars showing on the control room monitor.
3. If the system is copper throughout & the camera pictures are fed back to the control room coaxial copper cable, then the camera should be earthed at the video termination point in the control room & nowhere else. In this case the PCB "Earth Link" should be broken.
4. If the video is transmitted back to the control room via some non electrical connecting medium, e.g. fibre optic, radio or microwave link, then the camera should be earthed at the transmitter point in the PSU. The PSU "Earth Link" may be used for this purpose.
5. If dual earthing is unavoidable then a video isolation transformer should be fitted between the two earths.

### Lightning Protection

If the camera is fitted in a highly exposed place then consideration should be given to lightning protection. A good earth bonding connection to the case itself will provide protection against damage from secondary strikes.

Where there is a risk of a primary strike hitting the camera housing directly, it is recommended that a separate lightning conductor be fitted within 0.5m of the camera and at least 1.5 m higher than the camera.

The construction of the housing itself is very capable of coping with secondary strikes and no damage to the internal electronics or camera should result if correct lightning protection is applied.

### Electrical Connections



**WARNING:** Electrical Danger: Ensure all power is disconnected before opening or working upon the Power Supply Unit. Installation must be carried out by suitably qualified persons. Ensure that the National Electric Code, ANSI/NFPA, Canadian Electric Code, and all local country codes are observed.

A purpose built composite cable for use with the camera is available; these cables are pre-made with a Female terminated 12 way connector fitted to them for attachment to the Male connector installed into the base of the camera.

The composite cable has no termination (free wires) at the other end for wiring into the appropriate power supply. The standard colour coding used in these cables is as shown below.

**Table A – MIC412 Composite Cable Pin table**

Connector Pin	Signal Name	Wire Colour
A	Video Output	Coax core
B	Video Return	Coax screen
C	Tamper Sw	Black
D	Tamper Sw Rtn	Brown
E	Washer drive Rtn	Grey
F	Washer drive	Orange
G	Full Duplex Tx A.	Blue
H	Full Duplex Tx B.	Violet
I	Full Duplex Rx A. Half Duplex Tx/Rx A.	Yellow
K	Full Duplex Rx B. Half Duplex Tx/Rx B.	White
L	Power input 1.	Red
M	Power input 2.	Green



## CHAPTER 3 Power Supply Installation

Note: Refer to the *MIC Series Power Supplies Installation Manual* for detailed power supply information.

### MIC 412TI and MIC 412TF Power Supply Units

#### MIC-24PSU-UL, MIC-115PSU-UL, and MIC-240PSU-UL

The power supply provides power for a single MIC412 camera unit from either a 24 VAC source (MIC-24PSU-UL), 240 VAC source (MIC-240PSU-UL) or a 115 VAC source (MIC-115PSU-UL).

In addition the unit provides all the terminations required to connect a MIC 412 camera to third party equipment.

A second independent 12 V (600 mA) power supply is also included to drive any internally fitted optional interface cards.

Dimensions (W x H x L):

Power supply enclosure: 240 x 90.5 x 160 mm (9.5 x 3.6 x 6.3 in.)



**WARNING:** All external wires for installation applications must be routed through a permanently earthed metal conduit.

The Power Supply Unit provides all the support functions for connecting the camera to third party equipment. It comprises of:

1. A weather-resistant (IP65) cast-aluminium box pre-fitted with three (3) cable glands.
2. A power supply for the MIC 412 camera.
3. Provision for driving various interface cards mounted internally to the power supply box, for example an alarm interface card (non-IR power supplies only).
4. Provision for a signal interface card (BP-3 or BP-4) to connect telemetry to Bosch Biphase equipment.
5. Screw termination of all composite, telemetry and ancillary cables in the box.
6. Earth isolation and termination within the unit to correctly control video earthing and to prevent earth loop.

#### PCB Earth Link

The PCB has one link option next to HD1 to allow the power supply to be set up for different earthing schemes: The Earth Link should be broken if there is a separate connection between video screen and earth. This usually occurs on copper connected systems where all the copper video coaxes are taken back to the control room to be connected to a central earth point. If fibre optics or other indirect connections are used to get data and video to and from the control room then the earth link should be left intact provided it is the only camera end earth reference point.

#### Power Supply Layout and Connections

The power supply PCB has the following connections as shown on Figure A:-

- HD1 – Power Input Connector (screw terminal)
- HD2 - Tamper Switch header (screw terminal)
- HD3 - Composite cable header (Connections to camera head, screw terminal)
- HD4 - Telemetry header (molex connection)
- HD5 - Telemetry header (screw terminal)
- HD6 - Washer pump header (screw terminal)
- HD8 - Keyboard power connector (demo purposes only, not normally fitted)
- CN1 - Video out connection header (BNC)
- CN2 - Add on card header (plug in)

Figure A and the following tables show the connections required.



Figure A - MIC-Non-IR Power Supply Layout

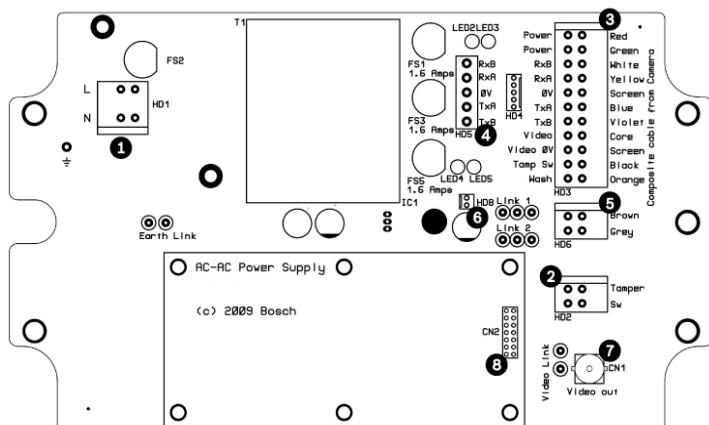


Table B – Power Connections

Item	PSU Terminal	Description	Connection
1	HD1	Power cable terminal	Screw terminal
2	HD2	Tamper switch terminal	Screw terminal
3	HD3	Composite cable terminal	Screw terminal
4	HD4 and HD5	Telemetry terminal	Screw terminal or Molex crimp
5	HD6	Heater terminal	Screw terminal
6	HD8	Optional MC-516 kbd power terminal	Molex crimp
7	CN1	Coax video terminal	BNC socket
8	CN2/3	Auxiliary card terminal	Plug in

Table C - Composite cable to Power Supply HD-3 Connection Table

Composite Cable Wire Color	Function	Terminal Box Connector	Terminal Box ID Marking
Red	AC supply	HD3-1	Power
Green	AC supply rtn.	HD3-2	Power
White	Rx +	HD3-3	RxB
Yellow	Rx -	HD3-4	RxA
Drain Wire	Gnd	HD3-5	GND
Blue	Tx -	HD3-6	TxA
Violet	Tx +	HD3-7	TxB
Coax Core	Video	HD3-8	Video
Coax Screen	Video Return	HD3-9	Vid 0v
Black (Optional)	Tamper Switch	HD3-10	Tamp Sw
Orange (Optional)	Wash drive	HD3-11	Wash

Table D –Telemetry Connections to HD3, HD4 and HD5

Telemetry Singal Name	HD3	HD4	HD5
RxB or Rx -	Pin 3	Pin 1	Pin 1
RxA or Rx +	Pin 4	Pin 2	Pin 2
GND	Pin 5	Pin 3	Pin 3
TxA or Tx -	Pin 6	Pin 4	Pin 4
TxB or Tx +	Pin 7	Pin 5	Pin 5



Table E –Auxiliary connections to HD6

Composite Cable Wire Colour	Function	Terminal Box Connector	Terminal Box ID Marking
Brown	Tamper Sw 0v or Heater*	HD6-1	0v
Grey	Wash drive 0v or Heater*	HD6-2	0v

\*See page 19 for details on commissioning MIC 412 cameras with the heater option fitted.

### Fuse ratings

The power supply houses 4 off 20 mm fuses in fuse holders. The ratings for these fuses if fixed on the low voltage secondary side but changes with input voltage on the high voltage primary side.



**NOTICE:** The given fuse ratings are for the fuses in the power supply box. The camera contains no serviceable parts.

The following table shows the fuse values fitted for the different supplies for operating the power supply:

Table F – Fuse Ratings for MIC-240THERMAL and MIC-115THERMAL

Fuse	Fuse function.	Rating for 240v Primary	Rating for 115v Primary	Rating for 24v Primary
FS 1	MIC 412 protection	1.6 A glass Anti surge (T)	1.6 A glass Anti surge (T)	1.6 A glass Anti surge (T)
FS 2	Primary protection.	500 mA quick blow	800 mA quick blow	2.5 A quick blow
FS 3	Heater protection 1	1.6A glass Anti surge (T)	1.6A glass Anti surge (T)	1.6A glass Anti surge (T)
FS 5	Heater protection 2	1.6A glass Anti surge (T)	1.6A glass Anti surge (T)	1.6A glass Anti surge (T)

**Note:** FS 4 does not exist

### Installation Instructions



**WARNING:** Electrical Danger: Ensure all power is disconnected before opening or working upon any Power Supply Unit. Installation must be carried out by suitably qualified persons. Ensure that the National Electric Code, ANSI/NFPA, Canadian Electric Code, and all local country codes are observed.

1. Locate the mounting position of the MIC-PSU so that it cannot be interfered with either intentionally or accidentally, a lockable cabinet is recommended.
2. Securely fix the MIC-PSU using M6 stainless steel screws washers (not supplied); ensure the cable glands have sufficient room to allow for the cables to enter approximately 60 mm on either side of the enclosure.
3. Open the power supply enclosure and undo the M3 screws on the internal shield and retain these; then remove the internal shield covering the mains



4. cable terminal HD1. Removing this shield also gives access to the blanking plug to allow a suitable conduit or the cable gland to be fitted.
5. If using a conduit for the power cord, remove the blanking plug and install a suitable conduit in its place. Secure as recommended by the conduit manufacturer.
6. If using a power cord without a conduit, remove the blanking plug and fit the 1/2-in. NPT cable gland instead as depicted below. Please note it is easier to fit the cord through the gland outside of the enclosure then attach the cable gland to the enclosure.
7. Carefully connect the Live and Neutral cores to the correct HD1 screw terminals as shown below and also printed on the PCB.

Live	HD1-L
Neutral	HD1-N
Earth	HD1-3

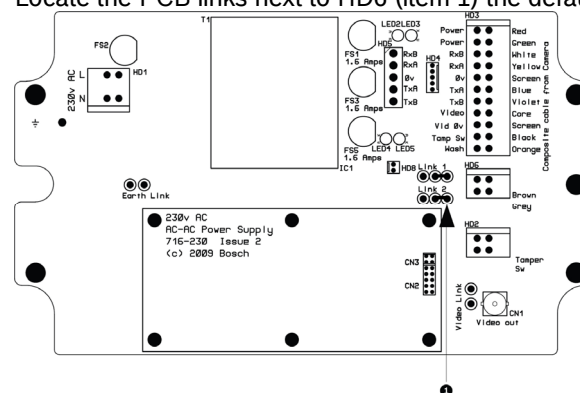
8. Crimp a 6 mm ring terminal (supplied) to the earth core on the power cord using copper washers. Securely bolt this to the earth termination post with the lid and PCB earth wires. Tighten the cable gland to secure and seal the power cord.
9. Reattach the mains head-end shield taking care to avoid pinching the cables and securely screw down.
10. Feed the shielded composite cable through the metal M16 gland; then connect the shielded composite cable to the screw terminal HD3 as printed on the PCB. When completed tighten the cable gland to firmly grip the shielded cable.
11. Connect a tamper switch to HD2, if necessary.
12. Feed the coax cable through the cable gland and crimp the end with a BNC connector then connect the coax video cable to the CN1 socket.

13. Use CN2 for additional add-on cards such as the 8-input alarm card or the Bi-phase card.
14. Crimp or screw telemetry connections to terminal HD4 or HD5 to connect the MIC camera to the control room.
15. When wiring is complete, apply power and check the all four (4) LEDs are lit.
  - LED1 – 18 VAC power on to camera
  - LED2 – 18 VAC power on to camera
  - LED4 – Power on for optional heater
  - LED5 – Power on for optional heater
16. Re-attach the enclosure lid and screw it down until tight.
17. For installation of the MIC-WKT-KIT, MIC-ALM or MIC-BP-4 Bi-phase card please refer to the respective manuals.

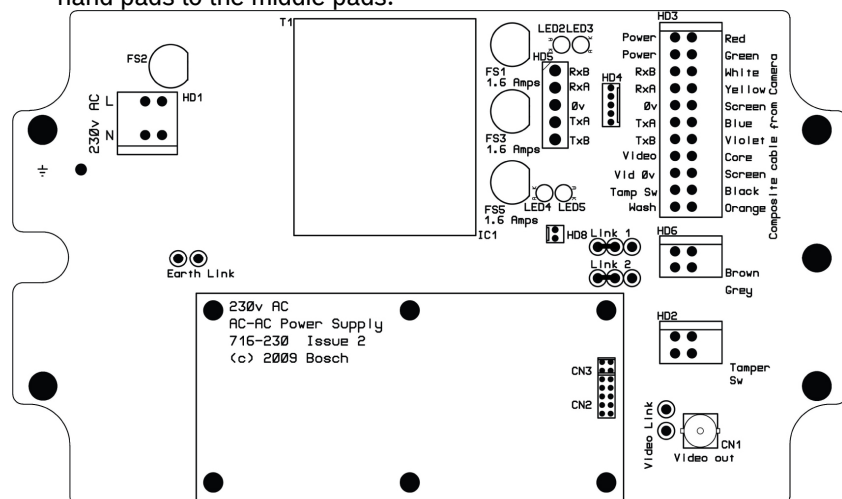
### Commissioning the MIC 412 with heater option fitted

These instructions are applicable to the MIC non-IR power supplies only. There are two links on the power supply printed circuit board which must be changed to allow heater operation. Please do the following to enable the heaters to function:

1. Disconnect the power supply from the power source.
2. Locate the PCB links next to HD6 (item 1) the default setting is 0 V.)



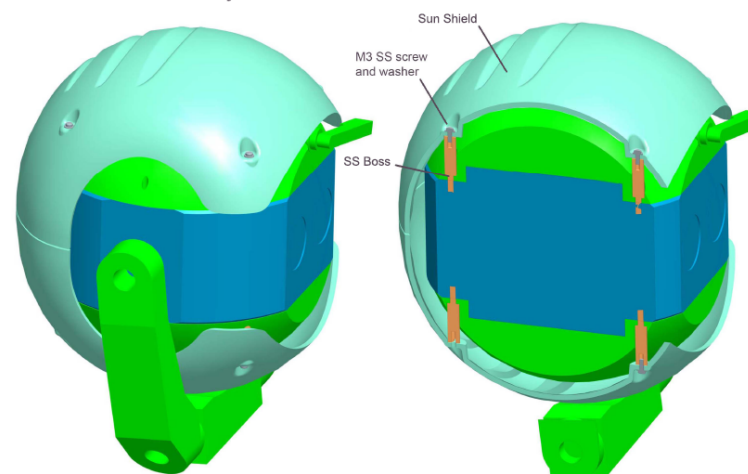
3. Break the two wire links and remove any excess solder.
4. Solder the wire links using a soldering iron and TCW link wire from the left hand pads to the middle pads.



5. The power supply will now deliver +18vac to HD6.
6. Connect the heater wires (brown and gray) from the shielded composite cable to the HD6 terminal as labelled on the PCB.
7. The heaters are thermostatically controlled and will automatically turn on at +5°C (+41°F) and turn off at +15°C (+59°F).
8. Check all connections, re-seal the PSU enclosure and re-apply power.

## Fitting the optional Sunshield

## Sun Shield Assembly



The MIC412 Sunshield is designed to provide additional protection against direct solar radiation, it is a two (2) part moulding and comes supplied with eight (8) stainless steel bosses and eight (8) M3 washers and retaining screws. The sunshield is fitted in the following manner:-

1. Remove the four (4) retaining bolts from the lid of the MIC 412, DO NOT remove the lid as this will void the warranty.
2. Replace each retaining screw with one of the stainless steel bosses and tighten using a flat head screwdriver in the slot on top of each boss.
3. When all four (4) bosses have been fitted, line up the holes in the sunshield with the bosses.
4. Fix the sunshield to the bosses using the M3 stainless steel washers and screws.
5. Rotate the MIC412 under power (Do not rotate by hand) and repeat the procedure above on the lower lid of the MI C412.

## CHAPTER 4 Configuring the MIC 412 Camera

### Connecting the MIC 412 to the PC

The MIC412 can be connected to a PC's serial port via a RS232/RS422 adaptor unit; this will generally be assigned to Comm Port 1.

Suitable serial port adaptor units are the Greenwich RS232/RS422 adaptor unit (Farnell 778-758, RS No: 201-758), the KK systems K2-ADE RS232 to RS485/422 adaptor or the MIC-USB485CVTR (485 to USB Converter) for PC's without a serial port.

#### Connecting the Greenwich Adaptor

To connect the Greenwich serial adaptor to the PC you will also need a 9 pin D female to 25 pin D male RS232 compatible adaptor cable. A suitable cable is Farnell 960-573 or RS Part No: 202-644.

The adaptor should be set to DCE mode and the power supply connected.

Connections from the Greenwich adaptor to the MIC412 power supply are as follows

**Table G – Connecting the Greenwich Adaptor**

Adaptor Connections	HD4
F 778-758.	Connection and wire color.
DATA OUT 6-3+	RXB White
DATA OUT 5-4-	RXA Yellow
SCREEN	0v
DATA IN 4-5-	TXA Blue
DATA IN 3-6+	TXB Violet

The connections can be tested by selecting the DETECT button in CamSet and checking to see if the window below this button displays the address and software version No of the camera being tested.

Should a problem be encountered then connect the MIC412 screen wire (0v) to the pc chassis with a separate piece of wire to ensure 0v continuity

#### Connecting the KK systems K2-ADE RS232 to RS485/422 Adaptor

This unit is self powered and can be plugged directly into the PC serial port. RS485 two wire mode.

Connections and Dip switches settings for 2-wire mode should be made as follows:-

**Table H – K2-ADE Adaptor connections**

Adaptor Connections	HD4
K2-ADE	Connection.
Pin 3	RXB White
Pin 9	RXA Yellow
Pin 5	0v
Not required	TXA Blue
Not required	TXB Violet



With all the above set up, when Camset is running and the serial port selected, set the Camera Interface Controls to the following:-

**Table I – Camera Interface Control Settings**

DIP Switch	Setting
Sw 1	OFF
Sw 2	OFF
Sw 3	OFF
Sw 4	ON
Sw 5	OFF
Sw 6	ON

If a notebook PC is used, which sometimes lacks a serial port, then a RS485 to USB converter such as the MIC-USB485CVTR can be used instead, this would typically be mapped to Comms port 3 or 4.

#### Connecting the MIC-USB485CVTR, USB to RS485 Converter

Camset Tabs	2 Wire RS485	4 Wire RS422
Comms 1	Selected	Selected
Interface	2 Wire	4 Wire
RTS	Off	On
Baud	9600	9600



The MIC-USB485CVTR is a USB to RS485 signal converter that allows PCs without a serial port to connect directly to the MIC400 series camera via the telemetry connection (HD4) in the power supply, the MIC-USB485CVTR can also be used to connect a PC to any other RS485 device.

The MIC-USB485CVTR has been designed to work with all functions in Universal Camset and to be backwards compatible with legacy version of Camset although full compatibility is not guaranteed.

The MIC-USB485CVTR should be connected to the telemetry header (HD4) of the MIC power supply with Standard Twisted Pair cable such as Belden 8760.

The table overleaf shows how the screw terminal connections on the MIC-USB485CVTR connect to the MIC power supply depending upon the protocol and selected communication mode you may only need a 2 wire configuration.



**CAUTION:** Should be taken to avoid earth loops when connecting 0v from the converter to GND terminal in the MIC

**Table J – MIC-USB485CVTR Connection Table and Diagram**

Converter Output	MIC Power Supply Telemetry Header (HD4 or HD5)	Communication Mode
RxB / Rx -	TxB	Full Duplex (4-wire only)
RxA / Rx +	TxA	
GND / 0V	GND	Shield (always)
TxA / Tx -	RxA	Simplex Half Duplex (2-wire) Full Duplex (4-wire)
TxB / Tx +	RxB	



### MIC-USB485CVTR and Universal Camset Software Installation

Universal Camset comes with WHQL certified drivers for the MIC-USB485CVTR that must be installed prior to connecting the converter to the PC.

To install the drivers please do the following:-

1. Locate the [USB DRIVERS.EXE](#) in the Universal Camset Folder, double click to begin and follow the on screen instructions to install; these are the required drivers for using the MIC-USB485CTR.
2. Locate the [CAMSET INSTALLER.MSI](#) and then double click to begin, follow the on screen instructions to install.
3. Once installed a Universal Camset Icon will appear on your PC Desktop.
4. When opened the Universal Camset will display the Standard Controls Tab as shown overleaf.

Providing the USB drivers have been installed successfully, you can then plug the MIC-USB485CVTR into a PC via the USB port. If your converter is being plugged in for the first time your system should recognise the device and inform you that the hardware has been installed successfully.

The MIC-USB485CVTR should appear in the Comm Port selection list as USB and as a virtual Comm Port, e.g “comm2” (for legacy support). Universal Camset has been optimised to work with this converter in USB mode; therefore users should select “USB” for maximum functionality and reliability.

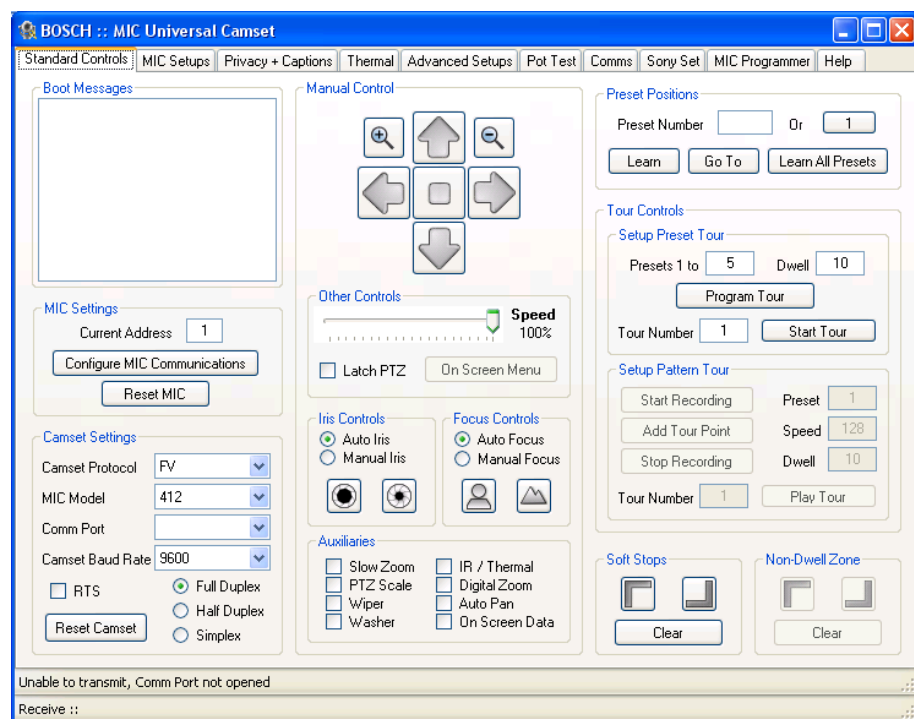
The MIC-USB485CVTR has a status LED indicating its current state, by sending a manual command e.g Left or Right; you should see the LED flash. Transmitted data from the converter is indicated by a red flashing LED flash and upon receiving data a green LED will flash.



## Commissioning the MIC412 through Universal Camset

Universal Camset is Windows PC based configuration software from Bosch Security Systems; it is issued free on the CD that comes with each MIC camera. Universal Camset supersedes all previous versions of Camset used.

### Standard Controls



Universal Camset opens on the **Standard Controls** tab as shown above; the highlighted area contains the Boot messaging, MIC settings and Camset Settings controls.

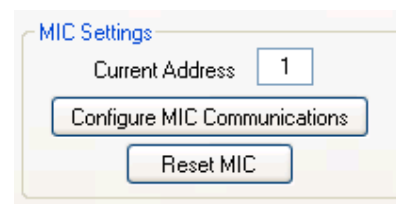
### Boot Messages



The large square text box in this area will display boot messages coming from the MIC. One of the first lines contains the MIC address which is decoded and entered into the **Address** line. The rest of the lines indicate the MIC model number, control card serial number, MIC Software etc.

At the same time, a boot message is displayed on the video indicating similar information, which may be helpful if return comms should fail or be incorrectly connected.

### MIC Settings



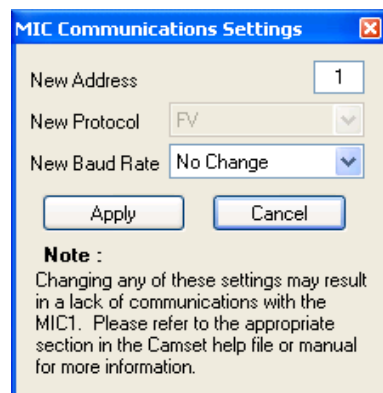
#### Current Address

This box indicates the address to which commands are sent from Camset. This therefore needs to match the address of the MIC that needs to be controlled. When the MIC is booted the first line of the messages it sends is the address, which is read and put into this box automatically.



### Configure MIC Communications

This button opens up a new window which provides the options to reconfigure the MIC communications settings. These options will depend on the MIC model connected.



In order for any of these modifications to work, Camset must have full communications with the MIC. Ensure this by performing a simple manual control test (Up, Down, etc). To store the new settings press [Apply](#) once the modifications have been made or alternatively press [Cancel](#) to discard any changes.

### New Address

This input box defines the new address the MIC should change to once Apply has been clicked. The value will also be copied over into Current Address on the main form to provide continual control.

### New Protocol

The drop down list here provides a full list of the protocols available in Camset. Control depends upon selecting the correct protocol in the drop down list to match the protocol that is loaded onto the MIC412; if the incorrect protocol is selected in Camset the MIC may not respond. To regain control should this happen, reset the Camset Protocol back to what the MIC originally was.

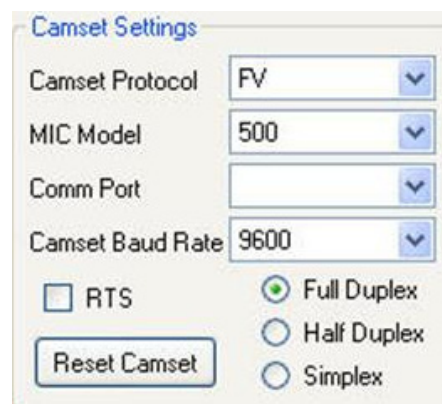
### New Baud Rate

This drop down list will provide the valid baud rates for the chosen protocol. The baud rate options reflect the protocol as set on the main form for Camset itself. In FV protocol the option is a toggle which simply switches the MIC between 4800 and 9600. If control is not present after the window is closed, try changing the Camset Baud Rate.

### Reset MIC

This sends out a command to reboot the software. This is not a hardware reboot; the only way to do that is to remove the power supply to the MIC.

### Camset Settings



The [Camset Settings](#) section as shown above control the Protocol, MIC model, Baud Rate and Comm Port used; select the appropriate parameters for your MIC400 from the dropdown menus.

Some functions in Universal Camset may not be supported by particular protocols; any incompatible functions will be greyed out if it is not supported in a given protocol.

The communication settings will be set to the default for the chosen protocol, indicating this on the Camset Baud Rate drop down list.



### MIC Model

This provides a list of all the available MIC Models. This should be set to the type of camera being controlled as Camset is then set up accordingly to provide more or less options dependant upon the combination of this setting with the Camset Protocol above.

### Comm Port

This provides a list of the available Comm Ports detected by the software on the PC. If a comm port is in use when it is selected the user will be prompted with an error, and should either select another port or close the application currently using it.

If the MIC-USB485CTR, USB to RS485 convertor is being used, when plugged in this will show on the Comm Port drop down menu as **USB**, simply select to use.

The final option is close which will close any open communications port meaning that other applications can then use the port for other purposes.

### Camset Baud Rate

This displays the current Baud Rate at which outgoing messages are sent, and the other options available for the given protocol above. Changing this without first changing the MIC baud rate will cause a loss of communications.

### RTS

This defines the state of the RTS line on the serial port which can be used power in line RS232 to 485 adapters.

### Comms Mode

There are 3 available options for comms modes:

**Full Duplex:** Full 2 way 4 wire communications connection. Messages are transmitted and received on separate comms pairs.

**Half Duplex:** 2 way, 2 wire communications connection. Messages are transmitted and received on the same pair of wires. The 485 drivers deal with the switching of the line directions automatically.

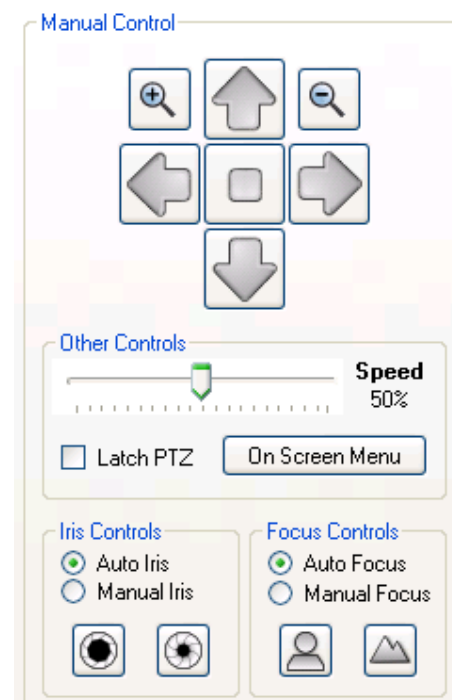
**Simplex:** 1 way 2 wire communications connection. Messages are only transmitted

to the camera. This will work for most manual controls, but anything that requires a response, such as Pot Test, Exact Positioning, and Programming etc will fail.

### Reset Camset

This re-initializes all of the controls for the software to the state it would be on boot.

### Manual Control



### Pan, Tilt and Zoom Controls

The **Up**, **Down**, **Left** and **Right** buttons send commands to the MIC to move in the selected direction at the speed indicated by the **Speed Slider**.



**Zoom In** and **Zoom Out** control the zoom position of the camera lens at a fixed rate.



**Latch PTZ:** This tickbox will Latch the PTZ controls for continuous tilt or rotation as required.

### Iris Controls



**Auto Iris** lets the MIC automatically adjust to changing light levels, where **Manual**

**Iris** gives the user control with **Open** and **Close** buttons.



### Focus Controls

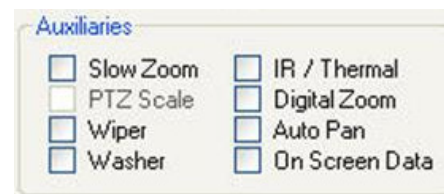


**Auto Focus** lets the MIC automatically focus on a changing scene, where **Manual**

**Focus** gives the user control with **Near** and **Far** buttons.



### Auxiliaries



**Slow Zoom:** Reduces the speed at which the MIC zooms.

**PTZ Scale:** Scales the MIC speed dependant on zoom position.

**Wiper:** Turns on or off the MIC wiper if fitted.

**Washer:** Activates the washer relay on the MIC-WKT card or the MIC-ALM card if fitted in the PSU. This also moves the MIC to the stored **WashWipe** position and turns on the wiper. Once de-activated the MIC will return to its original position and turn off the wiper.

**IR / Thermal:** Dependant on the MIC this will do one of 3 things, for a Non-IR Standard MIC the IR cut filter will come in and the image will go black and white. For a twin IR MIC, the cut filter will come in and the lamps will turn on.

Note: If the lamps do not turn on, ensure the power supply is an IR version and that **Auto Alarm** and **Multi Alarms** in the **MIC Setup** tab are both turned on.

For a MIC412, the video output will switch from the Sony module to the thermal module; the controls on the **Thermal** tab will also now function.

**Digital Zoom:** This will enable the MIC to continue into the digital zoom once the optical limit has been reached. This also needs to have **Digital Zoom Enabled** under the **MIC Setup** tab.

**Auto Pan:** This will start the MIC panning between left and right defined limits.

**On Screen Data:** This activates the Sony modules on screen icons.

### Preset Positions





Preset positions are locations stored by the MIC in Pan, Tilt and Zoom, Focus etc, which can be either called back manually, or returned to as part of a preset position tour.

To learn a position move the MIC to the desired location and then either enter in the preset number in the box available or press the [Preset Number](#) button until it displays the desired value. Then press the [Learn](#) button to store. Once stored the value in the input box will be cleared.

Returning to a position uses the same number entry method and then press the [Go To](#) instead.

The [Learn All Presets](#) button will set every preset position available for the given protocol to the current position. This may take a few seconds.

## Tour Controls



Tours provide a way of making a MIC continually move to points of interest within its visible range. There are 2 different methods to enable this; [Preset Tours](#) recalls preset positions in the set order waiting at each for a desired dwell time while [Pattern Tours](#) mimic the operators movements whilst recording so it can follow a defined path.

Access to these methods is entirely protocol specific, meaning if it is shaded out, the feature is not supported. In some cases there are up to 6 tours available.

### Preset Tours

To save a preset tour, simply enter the end preset number into the input box and a corresponding dwell time and press [Program Tour](#). This initiates a simple tour with each steps preset position being fixed and the dwell time constant across the tour, stored to the Tour Number. More comprehensive program methods are normally available through the control system.

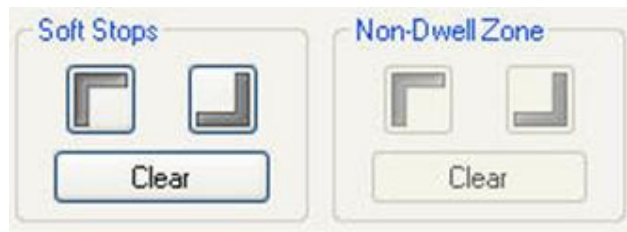
The [Tour Number](#) selects the tour to which you save and also play from. The [Start Tour](#) button initiates the current programmed sequence for the given Tour Number.

### Pattern Tours

Depending on the protocol, the controls for these vary. Some fully implement the recording functionality and in these cases the [Start Recording](#) and [Stop Recording](#) buttons are used, with user manual control in between. This is again stored to the [Tour Number](#) as set.

Other protocols use an add point method, where [Start Recording](#) and [Stop Recording](#) are used in the same way, but instead of manual control in the middle [Add Tour Point](#) is used to insert a preset position with the options specified [Preset](#), [Dwell](#) and [Speed](#).

### Soft Stops and Non Dwell Zones



This feature offers a method of restricting the MIC's movements to a certain area. A "box" is defined using the [Top Left](#) and [Bottom Right](#) buttons which provides the area within which the MIC is allowed to move. To clear the area set both corners to the same location.

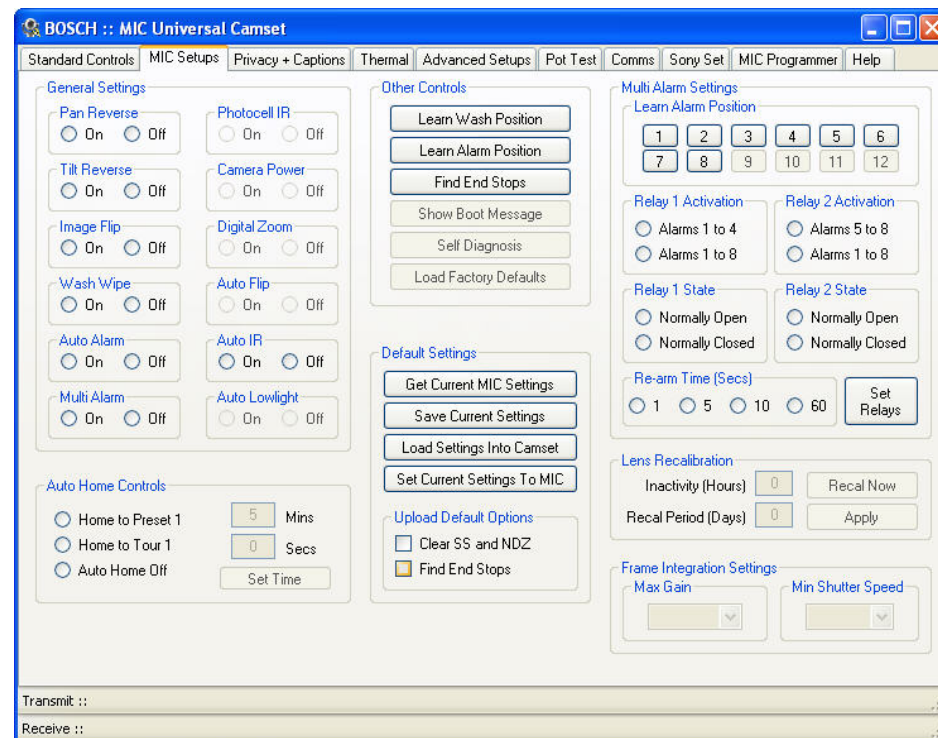
#### Non-Dwell Zone

This provides the opposite of Soft Stops, in that an area can be defined within which the MIC cannot stop. The area is defined and cleared in the same way using the [Top Left](#) and [Bottom Right](#) buttons. Once the MIC enters the area it passes straight through to the opposite edge.

#### Clear

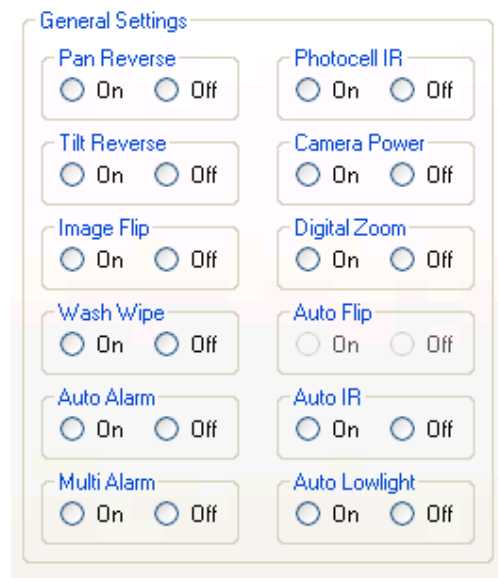
This button clears both the [Soft Stops](#) and the [Non-Dwell Zone](#), which is required after a MIC has its protocol re-flashed (see Programming section).

### MIC Setups



The [MIC Setups](#) tab contains the basic camera controls such as General Settings, Multi alarms (if MIC-ALM card is fitted), Relays, AutoHome options and the Default Settings.

## General Settings



### Pan Reverse

This will invert the pan rotation of the MIC compared to the commands from the controller. This would be used if a MIC was inverted to regain logical control.

### Tilt Reverse

This will invert the tilt rotation of the MIC compared to the commands from the controller.

### Image Flip

This manually inverts the image from the camera module, which may be used on an inverted camera where the head cannot be rotated through 180 degrees. Inverting the image would normally also require some modification of the control directions.

### Wash Wipe

If Wash Wipe is On then, when the Wash auxiliary is set the MIC will return to a preset Wash Position activate the washer relay in the PSU and turn on the wiper. When the auxiliary is turned off again, the MIC will return to its prior position and turn the wiper off. If Wash Wipe is Off then when the aux is activated the MIC will simply close the washer relay and remain in its current position.

### Auto Alarm

This is used for both single or multi alarm functionality. With Auto Alarm on and Multi Alarm off, the MIC will monitor the tamper switch line, moving to the programmable Alarm Position when the connection is grounded. If Auto Alarm is turned off the MIC will ignore any change in status of the tamper line.

### Multi Alarm

With this the user can setup a separate position for each of the 8 alarm inputs. Any given alarm input will trigger the MIC to move to the position with which it is associated. To get this functionality working both Auto Alarm and Multi Alarm should be turned on.

### Photocell IR

This mode enables the user to attach an external photocell to the power supply to control the IR lamps. The device is connected to alarm input 4, meaning that when the light levels drop sufficiently alarm 4 is triggered, and instead of moving the MIC detects this as an activation signal for the lamps. When the light levels pick up again, the alarm will deactivate and the lamps will be turned off. This mode can enable the user to hide the sensor away from any large external lighting which may cause the camera to flick in and out of IR mode under Auto conditions.

### Camera Power

This can be used to turn the camera module inside the MIC off as required.

### Digital Zoom

This is an override for the Digital Zoom Auxiliary, meaning that if On this will allow digital zoom to be controlled by the aux state, but if off, will never allow digital zoom no matter what the state of the aux.

### Auto Flip

With this enabled the MIC will pan through 180 degrees as it reaches the vertical position so the user can then tilt down the other side meaning the MIC video is never inverted. Once the rotation is complete the controls are reversed until a stop command is received, at which point they are returned to normal.

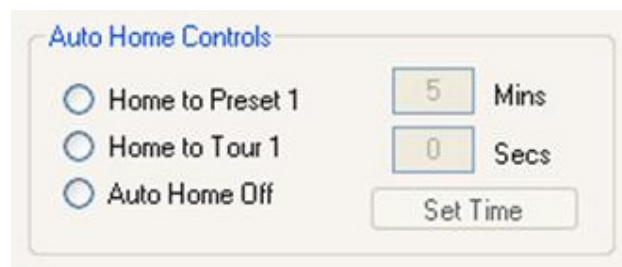
### Auto IR

In this mode the camera module is monitored for its current IR state, as soon as the light drops sufficiently, the module will automatically put the cut filter in place and switch to black and white, at which point the MIC will turn on the IR lamps.

### Auto Lowlight

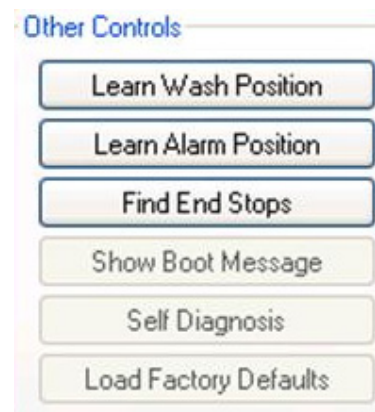
If this is turned on, the MIC will decrease its shutter speed as the light levels drop, rather than increasing the gain. Motion blur on the video can occur if the frame rate drops sufficiently low, which may not be ideal for a camera which is continually moving. However if motionless, the images will not have the grain associated with lowlight conditions. The gain at which a change is made and the lowest frame rate can be controlled under the Frame Integration section.

### Auto Home Controls



After a programmable time with no manual control the MIC can be configured to either, move to the home position (Preset 1) or start tour / pattern 1. With [Auto Home](#) turned off the MIC will simply remain stationary until the next user input. The amount of time before this takes place can be set using the input boxes and the [Set Time](#) button.

### Other controls



#### Learn Wash Position

This is the position that the MIC will return to when the Washer Auxiliary is activated and [Wash Wipe](#) is turned on. This should point towards the washer jet nozzle.

#### Learn Alarm Position

This is the alarm position for the tamper switch. The MIC will return to this position if [Auto Alarm](#) is turned on, [Multi Alarm](#) is turned off and the tamper line in the PSU is pulled to ground.

#### Find End Stops

This will get the MIC to rotate in the tilt axis first down then up to its mechanical limit stops. It will then store a "soft" limit a few units back from these for normal use. During this process manual control is not available.

#### Show Boot Message

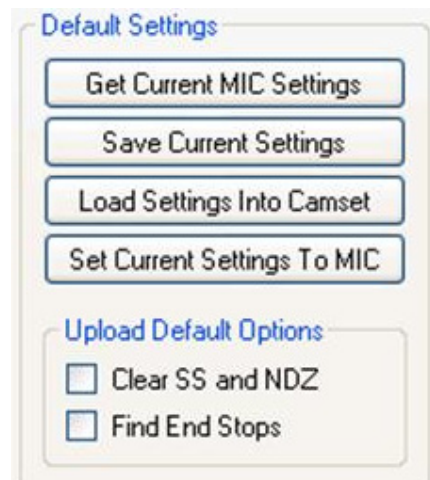
This will display the boot message that appears on the video for a few seconds, this may be helpful to determine the current software of the MIC, without having to do a full reboot.



### Self Diagnosis

This function is for future products and does not work with the MIC400 or MIC412.

### Default Settings



The Default Settings tab reads and sets settings from the following sections:

- Manual Control Auxiliaries
- General Settings
- Auto Home Controls
- Multi Alarm Settings
- Lens Recalibration
- Frame Integration Settings
- All Thermal controls

All other settings will not be saved, loaded, downloaded or set through the following controls.

### Get Current MIC Settings

This downloads the current status of each of the settings from the MIC and loads it into the text boxes and radio buttons on Camset. This provides an easy way of viewing the current setup of each MIC and also a way of copying the settings from one into the next.

### Save Current MIC Settings

This option will first prompt for a file location and then store the current state of all the options outlined above to an XML file which can then be loaded at a later date back into Camset as a standard for a specific site.

### Load Settings into Camset

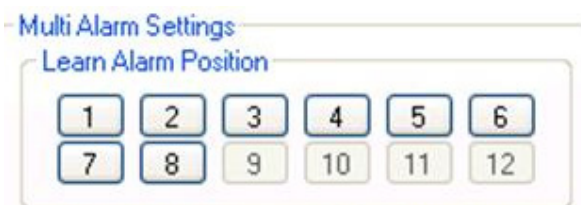
This will prompt to open an XML file as saved above. Only valid Camset Default XML files will work.

### Set Current Settings to MIC

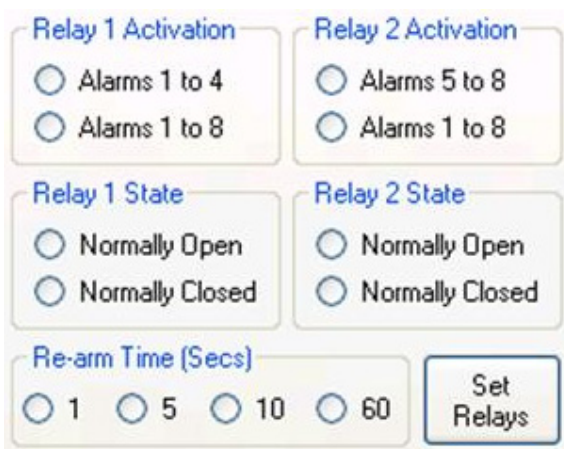
This will go through each of the settings above except for thermal, and send out the commands to the MIC to set it up as Camset displays. This may take a few seconds as there are several commands involved in this process.

### Upload Default Options

At the end of this there are 2 extra options for defaults, [Clear SS and NDZ](#) will clear any saved Soft Stops and Non-Dwell Zones and then [Find End Stops](#). These options may be used to completely set up a MIC after it has been reprogrammed to a new protocol.

**Multi Alarm Settings****Learn Alarm Positions**

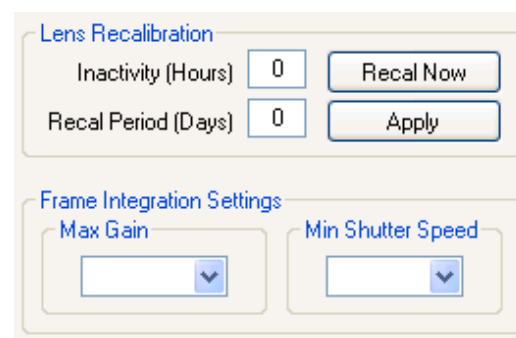
Simply point the MIC400 at the position you would like it to cover when each numbered alarm is triggered and press [Learn Alarm Position](#) to set this.

**Relay State, Activation and Re-arm**

This function is available only to MIC-400's with the MIC-ALM card fitted or the MIC400IR Power Supply which has Four (4) Alarm Inputs built in.

The MIC-ALM multi alarm card provides 2 output relays which can be configured to close or open on given alarm inputs. Relay 1 can be activated from either alarm inputs 1 to 4 or 1 to 8 and relay 2 with alarm inputs 5 to 8 or 1 to 8.

The re-arm time is a time in seconds before the MIC returns to its current position and returns the relay to its prior state. The options for this are 1, 5, 10 or 60 seconds. To send the settings to the MIC select the desired options and then press [Set Relays](#).

**Lens Recalibration and Frame Integration**

This section defines when and how often the Sony Optical Camera block should perform a recalibration process. The first field Inactivity defines how long in hours it should be after the last manual control command before the first recalibration should take place, and the second is a time in days between each successive recalibration from then on.

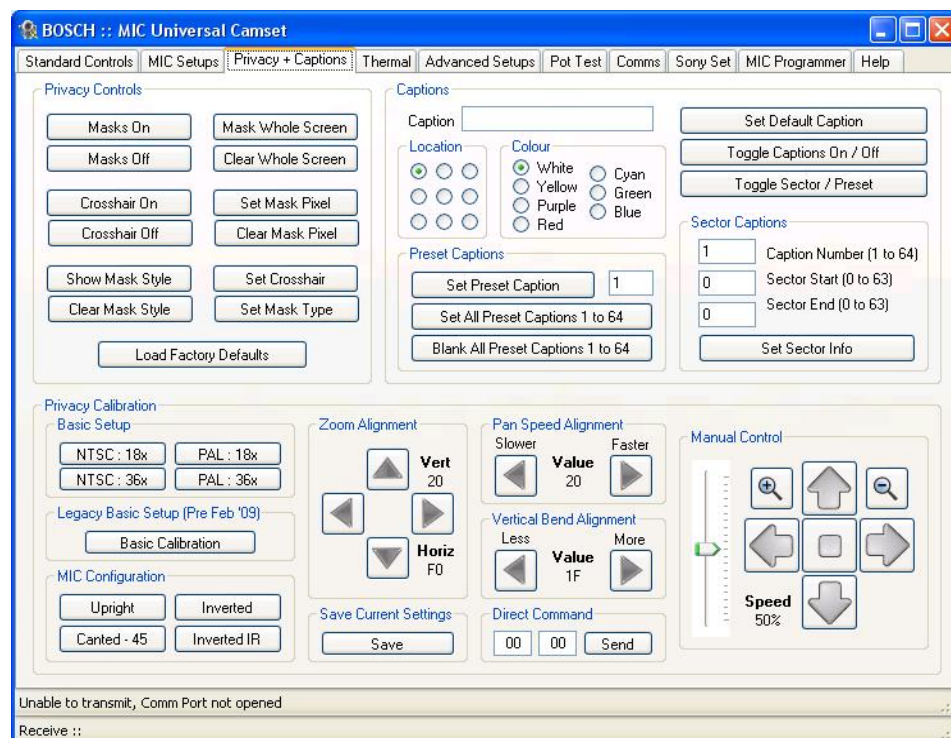
To set these enter the appropriate values in the text boxes provided and press [Apply](#). Alternatively the [Recall Now](#) button will perform a manual recalibration.

**Frame Integration Settings**

This section defines the [Max Gain](#) and [Min Shutter Speed](#) parameters used by the MIC when in Auto Lowlight mode. The drop down lists provides the actual settings available in dB for gain and FPS for shutter speed. The [On Screen Data](#) auxiliary command will indicate the current frame rate if required. The values are set by simply selecting the desired option from the drop down lists.



## Privacy and Captions



The [Privacy and Captions](#) tab allows the user to define and set the privacy mask function if the optional privacy card is fitted; this is not applicable to the MIC400 as the privacy card cannot be used with the thermal imager.

## Privacy Controls

### Masks On / Off

This is an override setting to turn masks completely **On** or **Off**. This will not clear each individual masks settings, so when **Off** is sent they will disappear and then re-appear with **On**, in the same positions.

### Crosshair On / Off

This setting makes a crosshair appear on the video display centered on the middle of the video. This can then be used to set individual mask pixels with the appropriate command from below.

### Show / Clear Mask Style

This setting provides a preview of the current mask style. This will only work if the Crosshair is turned **On**. It will show a small privacy block to the right of the crosshair center. If nothing appears, the mask may be clear, so use the [Set Mask Style](#) to change to a visible setting. Once the required style has been selected; press [Clear Mask Style](#) and [Crosshair Off](#), to return to the normal state.

### Mask / Clear Whole Screen

These functions will add or remove a privacy mask the size of the entire current view. Moving the MIC in Pan or Tilt should then indicate the zone clearly. This would most commonly be used in conjunction with zoom where a window can be made full frame and then the whole thing masked as apposed to the method below which may take significantly longer.

### Mask / Clear Pixel

This is a more accurate way of creating privacy masks one pixel at a time. The Pixel is created at the center of the image, or where the crosshair points if it is visible.

### Set Crosshair

This will create a pixel sized mask as with the function above, and will also bring up the crosshair. Press again to remove the crosshair or use [Crosshair Off](#)

### Set Mask Type

If Crosshair and Mask Style are both turned On this function can be used to step through each of the available mask types one at a time. This will not update all the masks to the same type, only the ones that are created subsequent to the change.

### Load Factory Defaults

Resets the privacy card to the factory defaults.

### MIC Configuration

These options define the MIC's orientation, which defines how the masks track. for Inverted MICs, the head would normally be rolled around through 180 degrees, with Pan Reverse On to regain sensible control. However, with inverted IR MICs, the head cannot be rotated around due to the IR Lamp arms, and therefore the video must be inverted, and both controls reversed.

### Basic Calibration

This sends a set of default commands to the MIC to initialize the privacy for an upright MIC. This will not be perfect as each board needs fine individual calibration but provides a good starting point.

### Zoom Alignment

The zoom alignment buttons provide accurate calibration of the mask tracking. This would normally be carried out by using a vertical line of mask on along a known straight edge. If this line then moves as the MIC pans and tilts, it can be corrected using the appropriate arrow. The labels indicate the current value in both the Vertical and Horizontal planes, which will be incremented or decremented dependant upon the direction pressed.

### Direct Command

All privacy commands consist of 2 Hex bytes, a command byte and a data byte. These perform all of the privacy functions available. To enter commands, enter the 2 bytes in Hex, into the boxes provided and press [Send Command](#). Entering random commands here may result in very odd results so please do not use unless under specific instruction.

### Save Current Settings

Once any calibration changes are made, this button should be pressed to save the new values permanently.

### Privacy Calibration



**CAUTION:** The Privacy Calibration settings should be configured at manufacture and should therefore not need to be changed on site. Any changes to these settings may be difficult to correct, so please do not attempt to change anything unless under instruction from Bosch.

The [Privacy Calibration](#) section deals with the calibration settings of the privacy masking. I.e. how the masks track as the MIC is moved in Pan, Tilt or Zoom.

### MIC Configuration

These options define the MIC's orientation, which defines how the masks track. for Inverted MICs, the head would normally be rolled around through 180 degrees, with [Pan Reverse On](#) to regain sensible control. However, with inverted IR MICs, the head cannot be rotated around due to the IR Lamp arms, and therefore the video must be inverted, and both controls reversed.

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### Save Current Settings

Once any calibration changes are made, this button should be pressed to save the new values permanently.

## Captions

The [Captions](#) tab allows the user to set up captions, Sector or Preset Captions; Screen Location and Caption Color are all user definable.

The MIC has 3 different caption options available. On the MIC 400 model range only one line of text is available and therefore a Preset Caption will overwrite a Default Caption.

The Default Caption can be treated as the name of the camera. It will appear on the video whenever it can, i.e. when no Preset or Sector captions are selected. Preset Captions can be used to display a different title for each of the preset positions available. This will be loaded once the MIC has reached the position. As an alternative, the same 64 captions can be used, not for preset positions but for rotational sectors. The MIC's pan is split into 64 segments and a different caption can be assigned to each or to a group. Using this option can result in an occasional slight control lag.

Whatever caption is being set the writing must be entered into the [Caption Text Box](#). The caption will be displayed in block capitals and only certain extra characters are recognized. Unknown characters will be displayed as "?".

### Location and Color

These options define where on the video and in what color the caption will be.

### Set Default Caption

This programs the current caption (if valid), position and color settings to the default caption. If captions are turned on this should appear immediately on the video.

### Toggle Captions On / Off

This setting is a global On / Off setting for captions. If Off then no captions will be displayed, Default, Preset or Sector.

### Toggle Sector / Preset

This toggles between the 2 caption modes of Preset or Sector. These options are mutually exclusive.

### Preset Captions

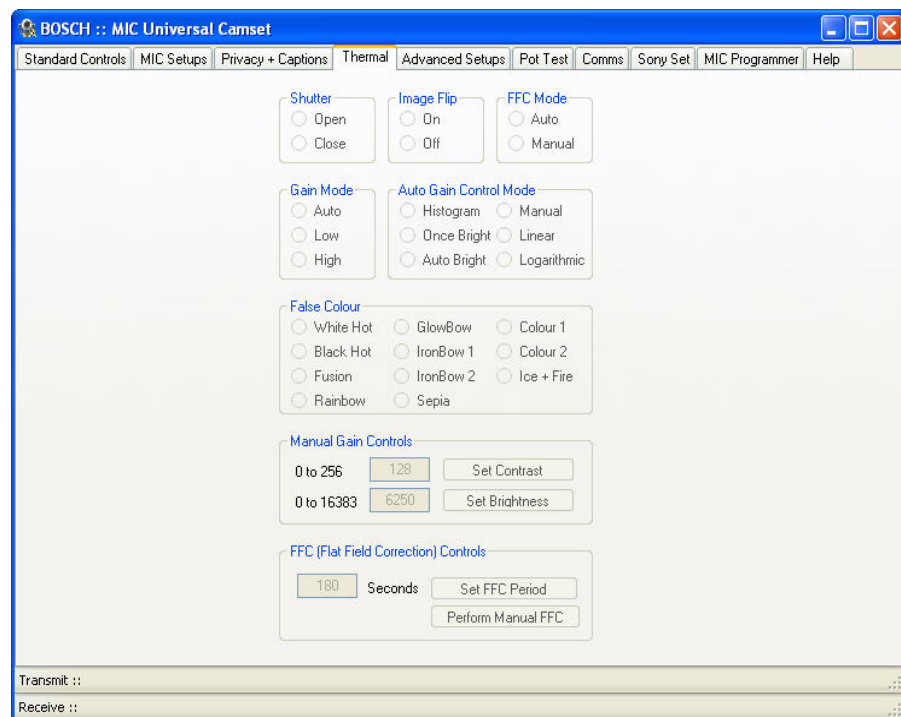
This section provides 3 options, to either set one preset caption to the preset number specified in the input box. Set all 64 presets to the same caption, or clear all 64 preset captions to nothing.

### Sector Captions

This section allows the definition of the sectors and what caption to use for each. First the Caption Number is entered which corresponds to a preset caption, then

the start and end of the group in terms of an individual sector. Press [Set Sector Info](#) to store the data.

## Thermal



The [Thermal](#) tab controls the function of the FLIR thermal imaging unit; this screen will only have active functionality when the IR/Thermal tickbox in the [Standard Controls](#) tab has been selected

### Shutter Open/Close

The Shutter option provides manual control over the physical shutter of the imager.

### Image Flip

Image Flip defines the orientation of the video output. As standard in the MIC 412, this is [On](#) as the imager is mounted inverted inside the MIC.

### FFC Mode and Settings

FFC stands for Flat Field Correction which is basically a refresh or recalibration of the imager's sensor. This process closes the shutter for about a second and at this time the video will freeze with the previous image. When performing an FFC a small green square will appear in the top corner of the video. This process can clear any ghosting that may appear on the video output over time.

There are 2 different modes of operation, [Manual](#) where the [Perform Manual FFC](#) should be used as required, or [Auto](#) which will perform an FFC at the interval set in seconds using [Set FFC Period](#). By default this should be somewhere in the region of 3 minutes.

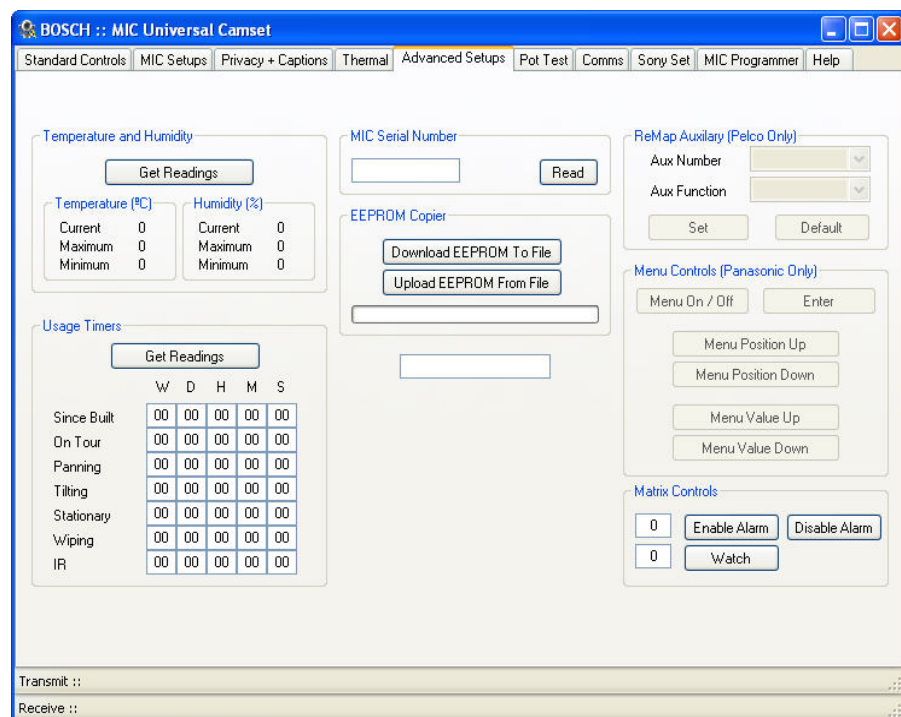
### Gain and Auto Gain Modes

The thermal imager has a number of different gain modes available dependant upon the application. By default [Gain](#) will be on [Auto](#) and the [Auto Gain Control Mode](#) will be [Histogram](#). [Histogram](#), [Linear](#) and [Logarithmic](#) modes are all fully automatic modes which provide different scaling dependant upon the scene itself, where the other modes require some user intervention, in the form of [Brightness](#) and [Contrast](#) settings which can be found under the [Manual Gain Controls](#) section. This may be desired to get a perfectly exposed image in a fixed level environment. For outdoor use it would be extremely difficult to specify manual settings that would work well over the whole day and with changing conditions.

### False Color

The thermal imager has 11 different false color options, which can highlight different temperatures on a scene in different colors. The color range's are not fixed and are dependant upon the gain settings of the imager, but for each specific setting the colors will always remain in order of temperature from coldest up to hottest over the scene. The Imager will remain in the False color mode selected here after disconnecting Camset.

## Advanced Settings



The [Advanced Settings](#) tab offers engineering and special auxiliary control modes for Pelco and Panasonic protocols (see Help file for details).

The MIC stores various statistics about itself, including temperature and humidity, and various timers for different parameters, which may be of interest to the end user, but are mainly implemented as an engineering tool.

### Temperature and Humidity

This will only work if the MIC400 has the appropriate control card with the temperature and humidity sensor attached. [Current](#), [Max](#) and [Min](#) are displayed for both in degrees and a percentage respectively. If the MIC reaches 70% humidity inside the head a small "H" is displayed in the top left corner indicating a Humidity problem. If this appears, make contact with Bosch Security Systems.

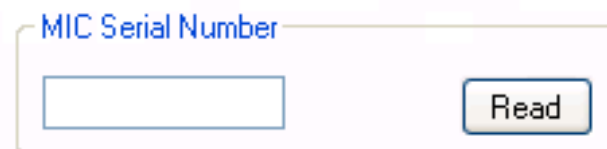
### Timers

The timers monitor most of the common functionalities of a MIC: Panning, Tilting, On Tour, Since Built, Stationary, Wiping and IR Lamp shown in Weeks, Days, Hours, Minutes and Seconds.

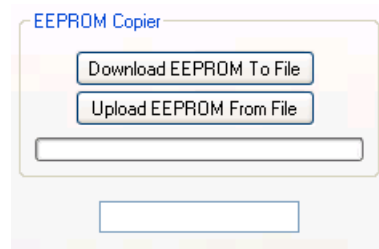
### Clear All Statistics

This function will set Max and Min for temperature and humidity to the current reading, and will clear all of the timers to "0". This feature should only be used when a MIC is first built or repaired, and therefore is locked out with the Advanced Controls Password.

### MIC Serial Number



This feature is used to set or read the actual MIC Serial Number. This may be required to reprogram the MIC through the telemetry. The Set function is locked out with the Advanced Password as this should only be performed at the manufacturing stage, however read is available to use as required.

**EEPROM Copier**

This feature can be used to download the complete EEPROM block from the MIC to a file and then upload it to another. This will port across every single setting stored in the MIC, thus making a mirror copy when loaded into the next. Everything except for the privacy calibration will be transferred as this is stored separately on the privacy card itself. Before using this feature ensure you are aware of the consequences, in that all preset positions will be changed to the ones stored in the file, same with the Sonyset table and finally the MIC address will also be copied.

Once uploaded, Camset will prompt to reboot the MIC which will then load the new settings into the MIC.

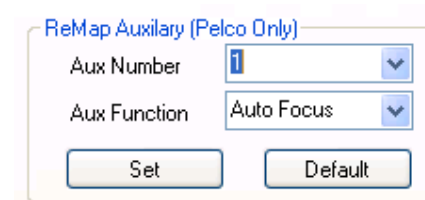
If any errors occur in the download or upload process then do not attempt to upload a half complete file, retry the process until it works fine.

**Download EEPROM To File**

This will prompt for a file location of type ".epm". If valid then the process will begin with the current status indicated on the progress bar. The file stores each data byte and its address in memory. These files should not be edited under any circumstances.

**Upload EEPROM From File**

This will prompt for an ".epm" file to open, again if valid the process will begin and the progress bar will show the current progress.

**Remap Auxiliary (Pelco Only)**

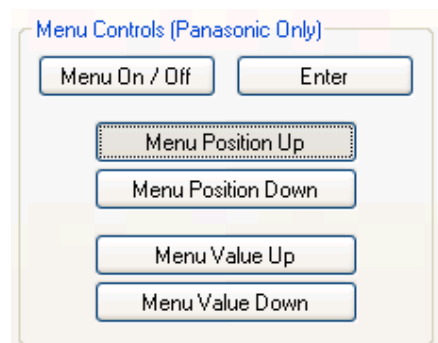
This section provides the option, for MIC400s with Pelco protocol only, to modify what aux the MIC actions for a given aux number input.

Pelco has 8 aux commands available and the MIC functions that can be mapped to them are as follow:

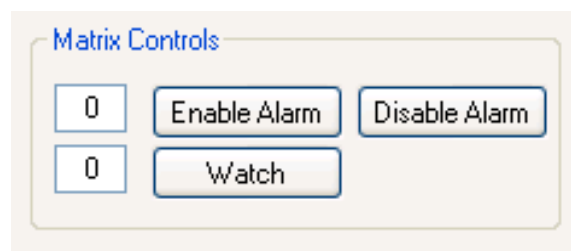
- Auto Focus
- Digital Zoom
- Auto Exposure
- IR
- Wiper
- Washer
- OSD
- Backlight

To modify an aux mapping, simply select the desired function and aux number from the list boxes and press Set. The default button will assign the functions in the order as above to aux 1 through 8.





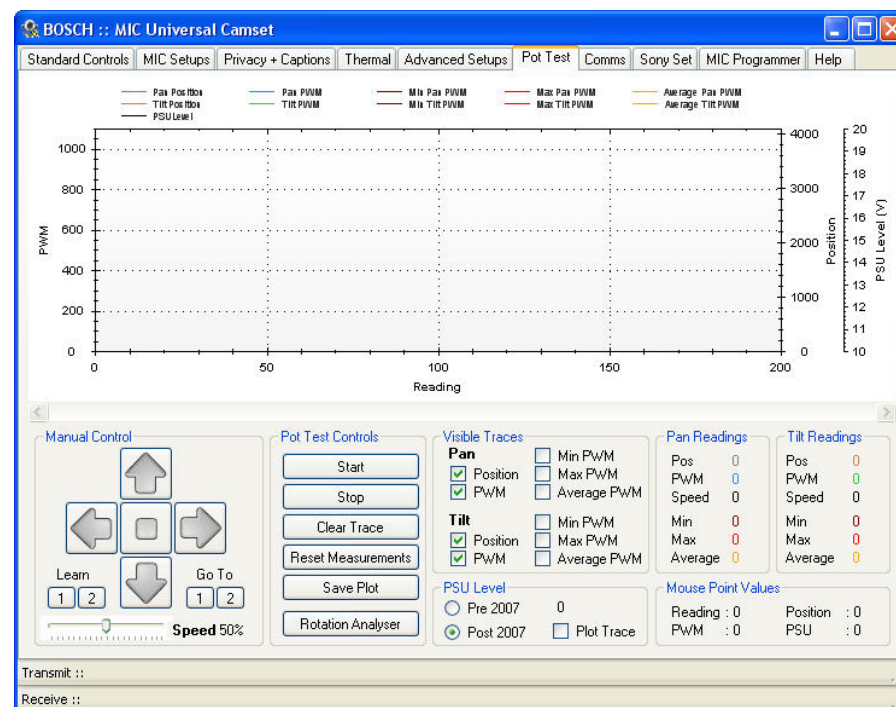
## Matrix Controls



The options here provide controls for a Forward Vision Matrix. The **Enable Alarm** and **Disable Alarm** buttons will take the number provided in the upper input box, and perform the specified function on that alarm input.

The **Watch** button can be used to change the input channel on a Matrix (1 to 16) to the value specified in the lower input box.

## POT Test



The **POT Test** tab is used as an engineering tool to determine the MIC's position, Motor PWM, Motor Speed in both Pan and Tilt, and the PSU level inside the MIC.

All the results are plotted onto a continually updating graph on the page and the current results shown in numeric values below. This process requires a reliable 2 way communications link with the MIC.

### Manual and Preset / Goto Controls

These work as per the controls on the Standard Controls page although instead of stopping when released the MIC will continually move until a separate stop

command is sent. The numeric key pad controls also work whilst in pot test although the learn preset method using the number keys does not.

### Pot Test Controls



#### Start

This initiates the Pot Test process. Continual commands will be sent requesting the MIC's current data, the responses will be decoded and data printed and plotted on the display.

#### Stop

This stops the process running. Pot Test is also stopped when another tab is selected to ensure communications aren't held up when trying to perform an operation from another page.

#### Clear Trace

This will clear the graph plotted and reset the cursor to the left hand side of the picture box.

#### Reset Measurements

Whilst **Pot Test** monitors the current values, it also measures the maximum, minimum and average readings for PWM in both the pan and tilt axis. These are displayed below the current readings in **Pan Readings** and **Tilt Readings** respectively. This button enables the user to reset these calculated values.

#### Save Plot

This control enables the graph plot to be saved as a .jpg image to a location determined on the save dialog box that opens.

### Rotation Analyzer

This sub window can be used to accurately measure the PWM of either axis of the MIC, plotting the data against position rather than reading, which provides a easy to read way of locating tight or loose spots in the tested axis. The results can then be saved as a Word .doc report and automatically printed to the default printer, whilst also giving the option to simply view the results on the window. The user can then use the mouse on the plot to drive the MIC back to suspect positions for further analysis. This functionality is only available in FV protocol, and works best with a baud rate of 9600. To exit the sub window press **Close**.

### Visible Traces

This section enables the switching on and off of the various traces available from the Pot Test plot. By default current Pan and Tilt position and PWM is displayed, and the following can be added, which are all real time calculations made since Reset Measurements was last pressed:

- Min Pan PWM - Maroon
- Max Pan PWM - Red
- Average Pan PWM - Orange
- Min Tilt PWM - Maroon
- Max Tilt PWM - Red
- Average Tilt PWM - Orange

As these are displayed in the same colors, it is recommended that only one set of Max, Min, Average be displayed at any one time.





**Pot Test Results**

Pan Readings		Tilt Readings	
Pos	0	Pos	0
PWM	0	PWM	0
Speed	0	Speed	0
Min	0	Min	0
Max	0	Max	0
Average	0	Average	0

**Pan / Tilt Pos**

These indicate the current position in Pan and Tilt in Red and Blue respectively, over the range of 4096 units for 360 degrees rotation.

**Pan / Tilt PWM**

These indicate the current PWM (Pulse Width Modulation) of the motor, with Pan and Tilt being indicated in Green and Purple respectively. This gives an indication of how hard the motors are working.

**Pan / Tilt Speed**

These results are the actual speed that the MIC is moving in either axis. The results are not plotted on the graph only shown in the respective window.

**PSU Level**

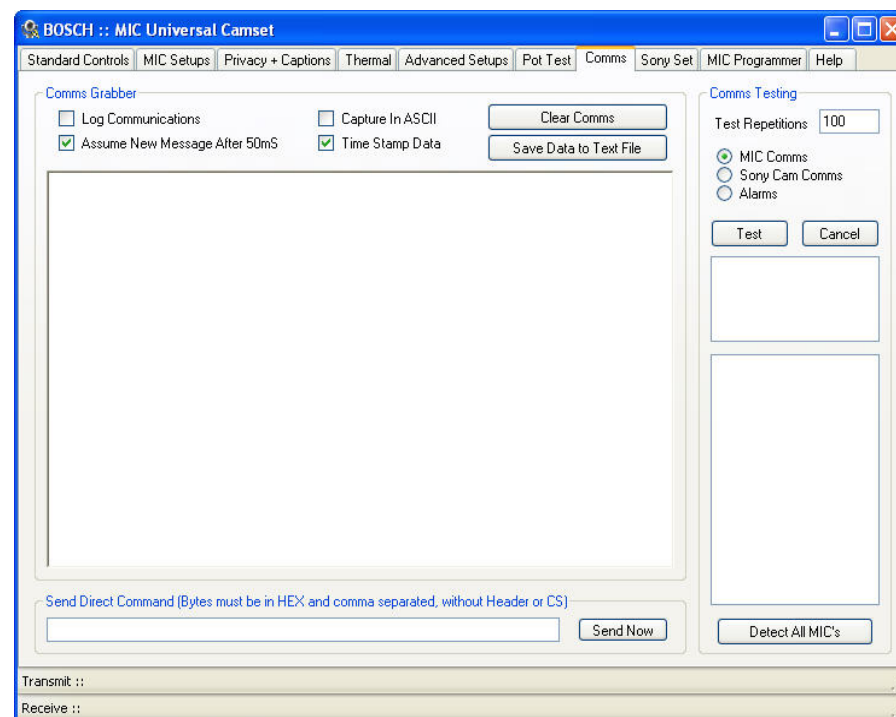
This reading shows the Voltage level of the main power rail in the MIC. There are 2 scaling options for different control cards, as a guide 6E came into production around mid 2007, so anything after this would use this option.

**Mouse Point Values**

This area indicates the scaled values corresponding to each of the 4 axis with respect to the current mouse position. This can be used to easily determine peak or trough values at any point on the trace.

**Pot Test Plot Area****Plot Area Controls**

The plot area can be zoomed in and out using the scroll wheel on the mouse, and then reset to default by pressing Right Mouse Click - Undo All Zoom/Pan. The plot can also be panned using the scroll bar to the lower of the plot area. By pressing Right Mouse Click - Show Point Values, the value of the point closest to the mouse pointer will be indicated as an X,Y coordinate in a box next to the pointer.

**Comms**

The **Comms** tab enables the user to monitor the communications to and from a MIC or any other serial device connected to the open comm port. This requires 2 way comms for any of the associated options.

**Log Communications**

This check box enables or disables the capture of incoming and outgoing data to the text display. With the Communications Grabber running the comms to and from the MIC will be slightly slowed down, which may be very noticeable on features such as Pot Test, so unless specifically required it would be advised that this is turned off.

### Capture in ASCII

This changes the way in which the data is displayed. If not checked then the data is displayed in comma separated Hex bytes (e.g. 54, 45, 53, 54), if it is checked then each byte is converted into its corresponding ASCII char (e.g. TEST). However this only works if the protocol sends out valid ASCII bytes, all other values, less than 32 and over 127 will result in a "?" being printed.

### Assume New Message after 50mS

This is a way of separating out consecutive commands and individually time stamping them. If there is a 50mS gap between transmitted or received bytes then the next byte is taken as a new message.

### Time Stamp Data

If checked then each new packet will be titled with the date and time of transmission or reception, otherwise the data will just be indicated with a Transmit or Receive tag.

### Clear Comms

This simply clears the current communications window.

### Save Data to File

This will prompt the user for a file location where the comms can be saved. They will be output as a ".doc" file formatted in the same way as display in the window, which can be opened in Microsoft Word.

## Send Direct Command

Send Direct Command (Bytes must be in HEX and comma separated, without Header or CS)

Send Now

This feature enables the user specify an exact command in Hex bytes to send to the MIC. The long input box is used to enter the command in individual comma separated Hex bytes, without the header or CS.

For example a complete Learn Preset 1 command in FV protocol is:  
0A 30 31 30 41 36 4D 30 31 80

The header on this is:  
0A 30 31 30 41 36

and the checksum:  
80

So to transmit the same command the input box should read:  
4D,30,31

Any variation on this will cause an error to be flagged indicating why the command is wrong. Once written the command is sent using the [Send Now](#) command.



**Communications Testing**

Comms Testing

Test Repetitions: 100

☒ MIC Comms  
☐ Sony Cam Comms  
☐ Alarms

Test Cancel

Detect All MIC's

Communications Testing enables the user to test the quality of the communications link to the MIC. This does require 2 way comms for any of the below options. Use the [Cancel](#) button at any time to stop the testing process.

**MIC Comms**

To initiate, select the MIC Comms radio button and press Test. This will repeatedly query the MIC for a set response the number of times of which is defined by the Test Repetitions input box. If the response is valid and within the correct time frame then it is logged as a pass. No response or a late response is flagged as a time out and short or incorrect data is classed as a fail. The results of this are continually displayed in the small window directly below the Test button. Any faults along the length of the comms lines will normally result in fails or timeouts dependant on the severity of the problem.

**Cam Comms**

Starting this is as with MIC Comms but by selecting the Sony Cam Comms radio instead. So long as the MIC Comms are 100% reliable this will return the reliability of the comms to the Sony Module inside the MIC, again returning passes, fails and time outs in the same frame. If these are intermittent, please contact Forward Vision for advice.

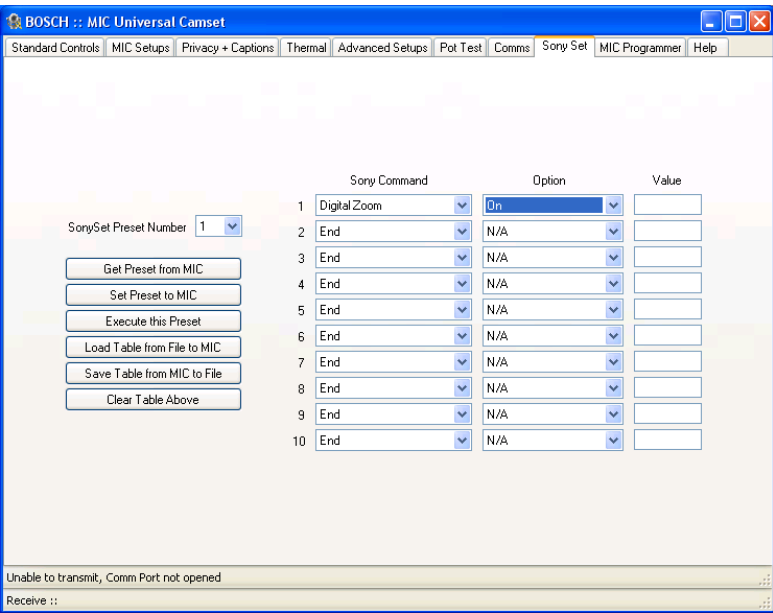
**Alarms**

This test monitors the state of the 8 alarm inputs if applicable, printing if they are turned On or Off continually throughout the test in the larger of the 2 results windows. The test is started by selecting Alarms from the options and pressing Test.

**Detect All MICs**

This sends out a request to each MIC address for its Software Version printing the Response and the respective address in the large results box. This can be used in conjunction with setting a site of multiple MICs all to address 0 (random address) to then find what address each is on and therefore regain control.

**SonySet Controls**



The **Sonyset** tab shows the controls required for Creating, Loading, Saving, Uploading and Downloading SonySet tables in FV protocol only.

A MIC can store 10 Sony Set tables, each containing 10 separate camera controls.

This means that a complete setup for the camera module (shutter speed, gain level, effect etc) can be saved and loaded back at any time through an input from the user. These can therefore be used to define certain camera states for different positions or requirements of an installation, for example, one could be set up for normal running auto everything, and another set-up for ANPR, with a specified frame rate and gain etc.

These states could then be toggled by calling them up with an **Execute SonySet** command.



**SonySet Prest Number**

This is where the SonySet Preset number is selected, there are 10 options available relating to 10 complete camera setups.

**Get Preset from MIC**

This process will query the MIC for the table number as specified in the SonySet Preset Number list. Each valid command and value will be shown in the table. If any data is incorrect or the command does not exist the Sony Command column will display "Invalid". It is not advised to reprogram a MIC with any "Invalid" commands.

**Send Preset to MIC**

This will read through the entire table checking for valid commands and respective values indicating any discrepancies, and then form the commands to send the data to the MIC. The data is stored to the preset number as indicated in the SonySet Preset Number in list.

Execute this Preset

This will send a command to the MIC to read the commands from the preset number in SonySet Preset Number list in memory and send them on to the Sony module. This will only send commands stored not the ones in Camset, so to test a Setup first use [Send Preset](#) to MIC then [Execute this Preset](#).

Load Table from File to MIC

It is also possible to Load a complete table of all 10 presets directly into the MIC from a file. This will prompt the user to open an XML file containing all of the information required. The information will not be displayed in the table display, it will simply be sent straight to the MIC.

Save Table from MIC to File

This creates the files that can be used by the feature above. First it will prompt for a file location to store and if valid, poll the MIC for each command of each preset and store all of the information to an XML file.  
Using the [Save](#) and [Load file](#) functions as above means it is possible to copy a complete SonySet table from one MIC to another to easily setup a site with the same configuration.

Clear Table

This clears the table in Camset and will not do anything to the data stored at the location in memory in the MIC itself. To clear a MIC table, use this function and then Send Preset to MIC.

The SonySet Table

	Sony Command	Option	Value
1	Digital Zoom	On	
2	End	N/A	
3	End	N/A	
4	End	N/A	
5	End	N/A	
6	End	N/A	
7	End	N/A	
8	End	N/A	
9	End	N/A	
10	End	N/A	

The table on the right of the form indicates the current state of one of the presets. The first column [Sony Command](#) indicates the command type for each of the 10 steps in each preset. The [Option](#) column indicates the current value for the chosen command, (e.g On or Off) or if the command is a direct set type, this will indicate the range available and the result is displayed in column 3, [Value](#).

A full list of available commands and values is shown below.

Changing any of the Sony Commands will invoke the corresponding Option to also change and take on the top value in the list of available options, therefore clearing the previous setting from memory. If the command type requires a numeric input, the corresponding Value box will indicate the lower bound of the range, which can then be changed to any valid value.



If only a few commands are utilised on the list then the rest should be set to "End" which will display "N/A" in the option column.

Below is a list of the available SonySet Commands and their corresponding Values or valid value ranges:

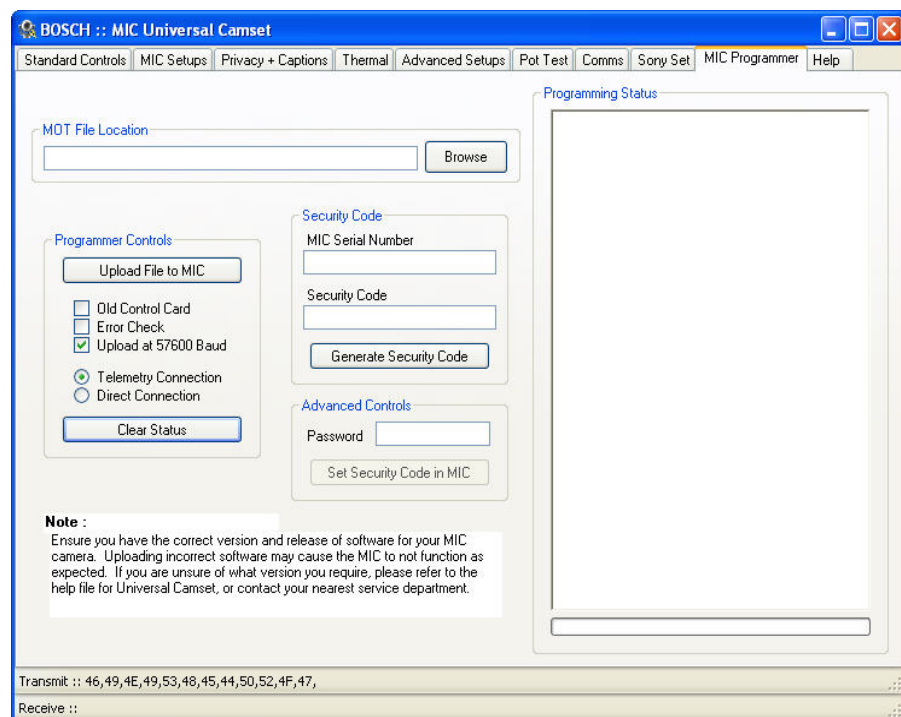
**Table K – Sonyset Commands**

Command	Value
Camera Power	On / Off
Zoom Set	0 to 28672
Digital Zoom	On / Off
Focus Set	4096 to 49152
Focus Mode	Auto / Manual
Focus Control	One Push Trigger / Force Infinity
AF Sensitivity	High / Low
Focus Near Limit	4096 to 49152
White Balance Mode	Auto / Indoor / Outdoor / One Push / Auto Tracing / Manual
White Balance Control	One Push Trigger
Red Gain Control	Reset / Plus 1 / Minus 1
Red Gain Set	0 to 255
Blue Gain Control	Reset / Plus 1 / Minus 1
Blue Gain Set	0 to 255
Exposure Mode	Auto / Manual / Shutter Priority / Iris Priority / Gain Priority / Bright / Shutter Auto / Iris Auto / Gain Auto
Slow Shutter Mode	Auto / Manual
Shutter Control	Reset / Plus 1 / Minus 1
Shutter Set	0 to 19
Iris Control	Reset / Plus 1 / Minus 1

Iris Set	0 to 19
Gain Control	Reset / Plus 1 / Minus 1
Gain Set	0 to 19
Bright Control	Reset / Plus 1 / Minus 1
Bright Set	0 to 19
Exposure Comp Control	Reset / Plus 1 / Minus 1
Exposure Comp Set	0 to 14
Exposure Comp Mode	On / Off
Backlight	On / Off
Aperture Control	Reset / Plus 1 / Minus 1
Aperture Set	0 to 19
Low Lux	On / Off
Hi Resolution	On / Off
Image Flip Horiz	On / Off
Freeze Frame	Off / Negative / Black & White
On Screen Data	On / Off
Caption Display	On / Off
Auto IR	On / Off
Camera Initialise	Lens Recal / Bad Pixel Correction
Image Flip	On / Off
End	N/A
Invalid	N/A



## MIC Programmer



The MIC programmer allows users to change the protocol of the MIC400 camera unit; you must have the protocol file (.MOT) you wish to upload available, these are available on the CD with the MIC412 or from the Bosch Security Systems.



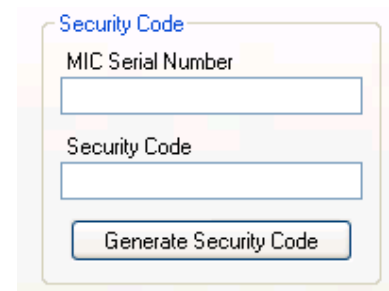
**CAUTION:** Ensure you have the correct version and software for your MIC400. Uploading the wrong software may cause the MIC400 to function incorrectly. If you are unsure of which version you require, please contact Bosch Security Systems.

To change a protocol loaded into a MIC400 please do the following:-

1. Connect the MIC400 to a PC running Universal Camset as described on page 27, check the MIC400 is communicating correctly with Camset; this can be checked using the Comms function.
2. Use the [Browse](#) button to locate the new .MOT file you wish to upload to the MIC400.

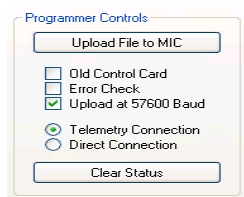


3. In the Security Code section, enter the MIC serial number in the appropriate field; click the [Generate Security Code](#) button. The security code will now be created.

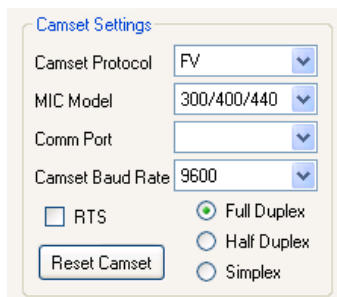




4. Check the programming controls are correct, the default settings are usually correct and do not typically require adjustment. Error checking can be enabled to ensure an error free installation but this result in longer loading times.

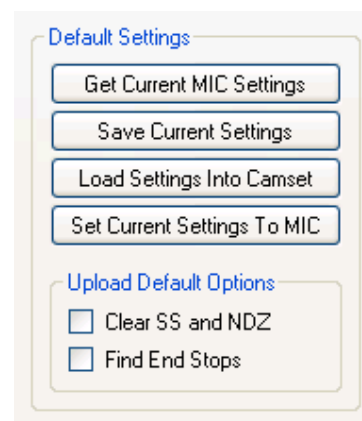


5. Click the [Upload File to MIC](#) to begin the upload, the status of the connection and progress of the upload will be displayed on the panel to the right hand side. The programmer will complete the upload, perform error checking then disengage automatically when finished, alerting the user when completed.
6. The MIC400 will now be loaded with the new protocol, camera control should be enabled immediately when the new protocol is selected under the [Standard Controls](#) tab but may require a reboot of the camera or closing and reselecting the USB in the Comm port dropdown menu.



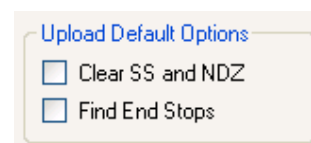
7. After programming a MIC the status of the settings can be undefined, therefore it is good practice to reset them to the factory defaults then make any modifications required for the specific installation.

8. Open the [MIC Setups](#) tab and click the [Load Settings into Camset](#) button



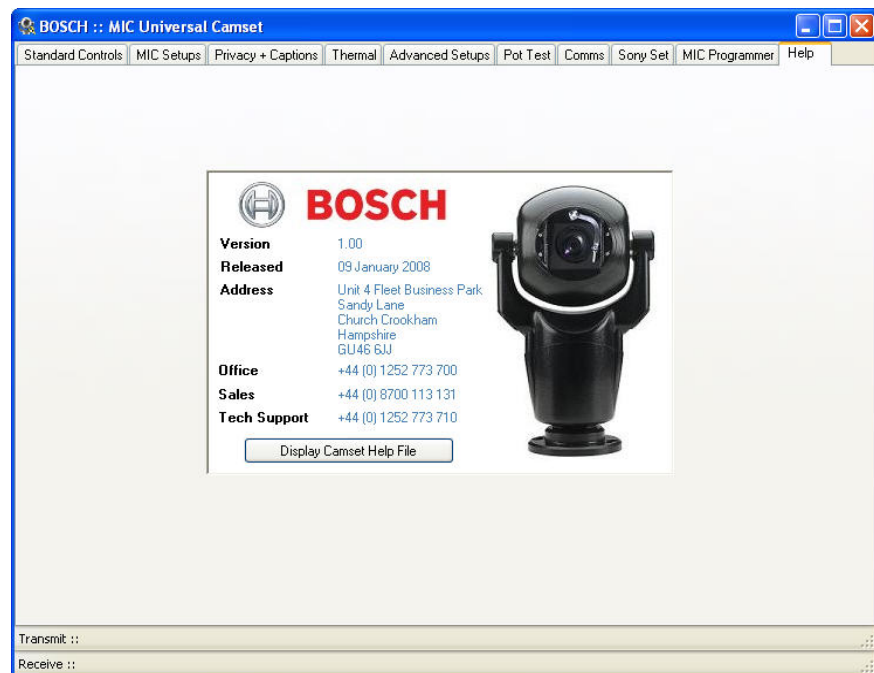
9. The open dialog should automatically display the "MIC Defaults" directory in the Camset Install location from which the File "MIC Production Defaults.xml" can be loaded. This will setup all the Universal Camset controls as per the factory defaults for the MIC.

10. Then click [Clear Softstops and NDZ](#) and [Find End Stops](#) tickboxes.



11. Finally click the [Set Current Settings to MIC](#), the MIC will then perform the Endstop test and will slowly rotate to find the endstops, the whole process should take about a minute after which the MIC is ready to use the new protocol.

## Help



The Help file contains full instructions for all Camset functions.

## MIC412 Preset Codes for the Thermal Imager

The MIC412 can be controlled via the MIC-501 or MIC-516 controllers as with any other MIC camera.

General preset codes for supported protocols can be found in Appendix B. However there are some special controls related to the thermal imaging unit in the MIC412 which are covered here and are limited to Four (4) protocols only.

Switching between the Thermal and Optical Video modules is activated through the **LAMPS** button.

### Learning a preset:

PROGRAM – PRESET – (PRESET NUMBER) - ENTER

**Go to a preset:**

PRESET – (PRESET NUMBER) – ENTER

All thermal controls through Learn preset commands:

Command	Value	FV	Pelco	VCL	516 Shortcut
<b>Image Inversion</b>	<i>On</i>	100	61	80	N/A
	<i>Off</i>	101	62	81	N/A
<b>False Colour</b>	<i>White Hot</i>	105	66	85	F3 On
	<i>Black Hot</i>	106	67	86	F3 Off
	<i>Ice Fire</i>	107	68	87	F4 On
	<i>GlowBow</i>	108	69	88	F4 Off
	<i>IronBow</i>	109	70	89	F5 On
<b>FFC</b>	<i>Auto</i>	103	64	83	N/A
	<i>Manual</i>	102	63	82	N/A
	<i>Perform</i>	104	65	84	N/A
<b>AGC Mode</b>	<i>Histogram</i>	110	71	90	F6 On
	<i>Linear</i>	111	72	91	F6 Off
	<i>Auto Bright</i>	112	73	92	N/A

**Bosch Protocol**

Aux Number	Aux On Function	Aux Off Function
451	Thermal Video Flip On	Thermal Video Flip Off
452	Thermal FFC Mode Auto	Thermal FFC Mode Manual
453	Perform FFC	N/A
454	Thermal Colour White Hot	Thermal Colour Black Hot
455	Thermal Colour Ice Fire	Thermal Colour GlowBow
456	Thermal Colour IronBow	Thermal AGC Histogram
457	Thermal AGC Linear	Thermal AGC Once Bright



CHAPTER 5 **Technical Specifications****MIC412TI and TF Dual Optical/Thermal PTZ Camera****CAMERA MODULE (OPTICAL)**

Image sensor	1/4" EXview CCD
Picture elements	380K NTSC / 440K PAL (WIDE)
Horizontal resolution	WDR 36x modules 530 TVL NTSC / PAL
Filter	Automatic mechanical IR cut filter
Focus system	Auto or manual
Iris	Auto or manual with slow shutter integration modes
Synchronisation	Internal / External (V-Lock)
Signal/Noise ratio	50 dB or more
Back Light Compensation (BLC)	On/Off
White balance	Automatic
Automatic Gain Control (AGC)	-3 to -28 dB, 2dB steps
Aperture control	16 Steps

**36x optical zoom module**

Lens	F=3.4 mm (WIDE) to 122.4 mm (TELE), F1.6 to F4.5
Zoom	36x optical (12x digital)
Angle of view	57.8° (WIDE end) to 1.7° (TELE end)
Minimum illumination	1.4 lux (1/60s NTSC, 1/50s PAL, F1.6, 50 IRE), 0.1 lux (1/4s NTSC, 1/3s PAL, F1.6, 50 IRE) 0.01 lux (1/4s NTSC, 1/3s PAL, ICR ON)
Shutter speed	NTSC: 1/4 to 1/10,000s (22 steps) PAL: 1/3 to 1/10,000s (20 steps) 1/10,000s (20 steps) PAL

**CAMERA MODULE (THERMAL)**

Lens	50mm
Image sensor	Focal Plane Array (FPA), un-cooled Vanadium Oxide microbolometer (MIC412TI: 7.5Hz NTSC, 8.3Hz PAL) (MIC412TF: US export licence required: 30Hz NTSC, 25Hz PAL)
Picture elements	324 (H) x 256 (V)
Spatial resolution	0.760 mrad with 50 mm lens
Field of view	14° (H) x 11° (V) with 50 mm lens
Focus	Factory-set at infinity focus
Detection range	Human: 780 m (2559 ft) Object : 2.2 km (7218 ft)
Spectral response	7.5 to 13.5µm
Thermal sensitivity	<85 mK at F1.6
Features	White hot, black hot and false colour

**OPERATIONAL\***

E-flip	Yes
Manual flip	Yes
Presets	64 telemetry presets accurate to less than 0.1° utilising resolver technology (using FV protocol, 10 camera set-up presets to allow ANPR, colour correction etc.) 6 tours, each with up to 32 presets
Preset tours	Yes (64 sectors), 20 characters per title
Sector titles	20 character caption for each of the 64 presets
Preset titles	Yes (preset 1 or tour)
Home position	

**COMMUNICATION & PROTOCOLS**

Communication	RS485 / RS422
Control Protocol	Refer to protocol list on datasheet



**CONNECTIVITY**

Video	Single coaxial via composite cable
Telemetry	Twisted pair. Simplex, half and full duplex operation via composite cable
Power	Via composite cable

**ALARMS**

Alarm inputs	1 x tamper input (additional inputs possible with optional alarm card in PSU)
Alarm communication	Tamper switch (ground connection)

**MECHANICAL**

Drive unit	Brushless Integral pan/tilt motor drive
Pan angle	360° continuous rotation
Pan speed	Up to 72° per second (variable)
Tilt angle	260°
Tilt speed	0.2° to 90° per second variable
Speed control	Closed loop electronics
Preset accuracy	±30° (typical)
Proportional P/T to Zoom	Yes

**PHYSICAL**

Construction material	Machined aluminium
Viewing window glass	Tempered flat glass (optical) & germanium covering (thermal)
Standard colours	Black (RAL9005), Grey (RAL7001) or White (RAL9003)
Standard finish	Alocrom 1200 surface treatment with powder coat paint
Window Wiper	Standard, long-life silicon

Dimensions (W x H x D)

267 x 445 x 200 mm, including 4-in. PCD base  
(10.51 x 17.52 x 7.87 ft)  
9.5 kg (20.94 lb), including 4-in. PCD base

Weight

**ENVIRONMENTAL**

Operational temperature  
Weather proofing

-40°C to +50°C (-40°F to +122°F)  
IP68 (1 m submersion for 24 hrs)

**ELECTRICAL**

Input voltage (dual voltage)  
Input current

18 VAC, ±10%, 50/60 Hz  
Camera: 2 A  
Heater: 1 A

**AVAILABLE OPTIONS**

Configuration  
Camera module (optical)  
Camera colour system  
Installed protocol  
Telemetry control card  
Window wiper  
Alarm card  
Washer

Upright mount or inverted mount options  
36 x camera module  
NTSC or PAL  
Choose from current protocol list  
Supplied as standard  
Supplied as standard  
Optional (In PSU), factory fit  
Optional (washer bracket only)

**ACCESSORIES**

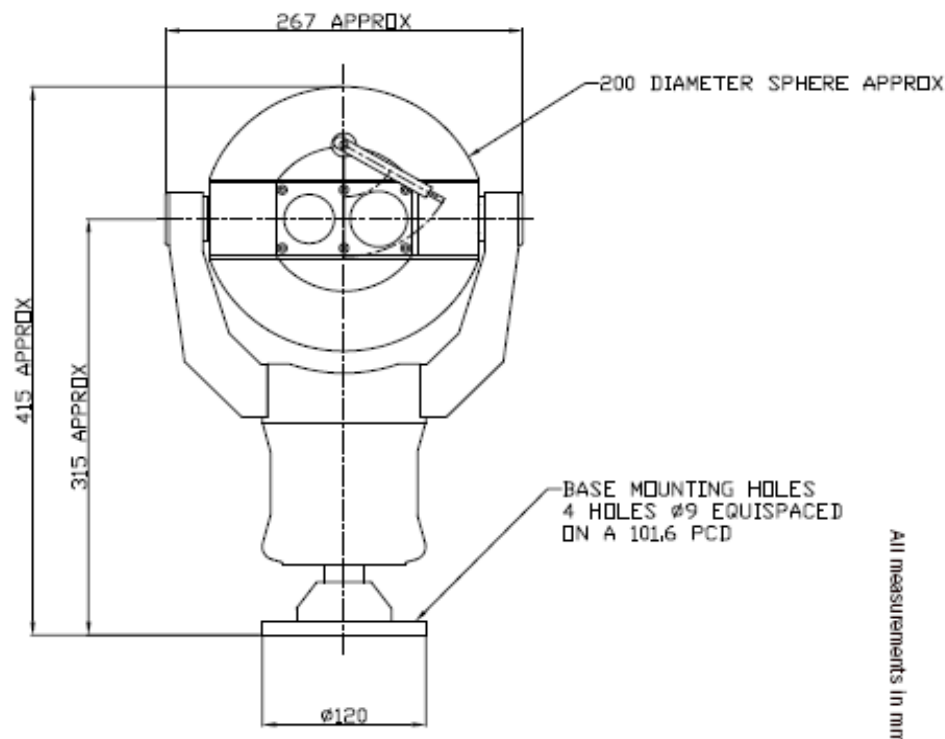
Power supply  
Mounting hardware  
Cabling

Choice of 24 VAC, 115 VAC, or 230 VAC  
Compatible with all MIC series bracketry  
Optional, Choose from 2 m, 10 m, 20 m or 25 m versions



## Dimension Drawings

MIC 412 models; Upright (90°) Dimension Drawings



## Appendix A – Sonyset Camera Commands

cam power: on	bright: +1
cam power: off	bright: -1
cam zoom	bright: set
digital zoom: on	exposure comp: reset
digital zoom: off	exposure comp: +1
focus	exposure comp: -1
autofocus	exposure comp: set
manual focus	exposure comp: on
focus one push trigger	exposure comp: off
focus force infinity	backlight: on
AF sensitivity: high	backlight: off
AF sensitivity: low	aperture: reset
focus near limit set	aperture: +1
white balance: auto	aperture: -1
white balance: indoor	aperture: set
white balance: outdoor	low lux: on
white balance: one push	low lux: off
white balance: auto tracing	ir leds: on
white balance: manual	ir leds: off
white balance: one push trigger	left/right reverse: on
red gain: reset	left/right reverse: off
red gain: +1	freeze frame: on
red gain: -1	freeze frame: off
red gain: set	effect: off
blue gain: reset	effect: pastel
blue gain: +1	effect: negative
blue gain: -1	effect: sepia
blue gain: set	effect: black and white
exposure: auto	effect: solarize
exposure: manual	effect: mosaic
exposure: shutter priority (frame int)	effect: slim
exposure: iris priority	effect: stretch
exposure: gain priority	digital effect: off
exposure: bright	digital effect: still
exposure: shutter auto	digital effect: flash
exposure: iris auto	digital effect: lumi
exposure: gain auto	digital effect: trail
slow shutter: auto	digital effect: level
slow shutter: manual	camera memory: reset
shutter: reset	camera memory: set
shutter: +1	camera memory: recall
shutter: -1	on screen data: on
shutter: set	on screen data: off
iris: reset	date display: on
iris: +1	date display: off
iris: -1	time display: on
iris: set	time display: off
gain: reset	caption display: on
gain: +1	caption display: off
gain: -1	
gain: set	
bright: reset	

## Appendix B – Protocol Preset Codes

### PRESET CODES

#### Pelco

MULTI_ALARM_PRESET	16	// 16 to 24
NORMAL_TILT_LIMIT_PRESET	26	
IR_LAMP_TILT_LIMIT_PRESET	27	
BAUD_2400	28	
TILT_REVERSE_PRESET	29	// toggle
IMAGE_FLIP_PRESET	30	// toggle
REMAP_AN_AUX	31	
PHOTOCELL_IR_ON_PRESET	32	
PHOTOCELL_IR_OFF_PRESET	33	
AUTOHOME_SEQUENCE_PRESET	35	
AUTOHOME_OFF_PRESET	36	
AUTO_IR_ON_PRESET	37	
AUTO_IR_OFF_PRESET	38	
CANTED_PRESET	39	
BAUD_9600	40	
BAUD_4800	41	

WASHWIPE_PRESET	42
AUTO_ALARM_GOTO_PRESET	43
FIND_END_STOPS	45
SEQUENCE_RECORD_PRESET	48
SEQUENCE_RECORD_STOP_PRESET	49
SET_TOUR1_PRESET	50
//	51
//	52
//	53
//	54
SET_TOUR6_PRESET	55
AUTO_ALARM_ON_PRESET	56
AUTO_ALARM_OFF_PRESET	57
AUTO_LOWLIGHT_ON_PRESET	58
AUTO_LOWLIGHT_OFF_PRESET	59
ADDRESS_CHANGE_PRESET	60
PRIVACY_PRESET_START	61
PRIVACY_PRESET_END	75
AUTOFLIP_ON_PRESET	76
AUTOFLIP_OFF_PRESET	77





WASHWIPE_ON_PRESET	78			
WASHWIPE_OFF_PRESET	79		FRAME_SCAN_START_PRESET	98
INVERTED_PRESET	80		AUTO_SCAN_START_PRESET	99
UPRIGHT_PRESET	81		AUTOHOME_10S_PRESET	40
MULTI_ALARM_ON_PRESET	82		AUTOHOME_30S_PRESET	41
MULTI_ALARM_OFF_PRESET	83		AUTOHOME_1M_PRESET	42
DIGITAL_ZOOM_DISABLE	84		AUTOHOME_5M_PRESET	43
DIGITAL_ZOOM_ENABLE	85		AUTOHOME_10M_PRESET	44
PTZ_SCALE_ON_PRESET	86		FAST_SHUTTER_PRESET	45
PTZ_SCALE_OFF_PRESET	87	//defines for limit setting presets	NORMAL_SHUTTER_PRESET	46
SOFTLIMIT_TOP_LEFT_PRESET	88	// Always lowest number	PRIVACY_SET_WHOLE	75
SOFTLIMIT_BOTTOM_RIGHT_PRESET	89		PRIVACY_CLEAR_WHOLE	74
NONDWELL_TOP_LEFT_PRESET	90		PRIVACY_UNCOVER_ALL	73
NONDWELL_BOTTOM_RIGHT_PRESET	91	// Always highest number	PRIVACY_REPLACE_ALL	72
SCAN_LIMIT_LEFT_PRESET	92	// Always lowest number	PRIVACY_SHOW_STYLE	71
SCAN_LIMIT_RIGHT_PRESET	93		PRIVACY_HIDE_STYLE	70
CAMERA_RECALIBRATE_PRESET	94		PRIVACY_SET_STYLE	69
SCAN_SPEED_SET_PRESET	95		PRIVACY_SET_CENTRAL	68
STOP_SCAN_PRESET	96	// goto presets	PRIVACY_CLEAR_CENTRAL	67
RANDOM_SCAN_START_PRESET	97		PRIVACY_SHOW_CURSOR	66
			PRIVACY_HIDE_CURSOR	65



PRIVACY_SAVE_PARAMETER	64
PRIVACY_LOAD_PARAMETER	63
PRIVACY_INIT_PARAMETER	62
PRIVACY_SET_CURSOR	61
CAMERA_COMMAND_PRESET1	240
CAMERA_COMMAND_PRESET10	250
RESET_PRESETS_PRESET	255

### 360 Vision

WASHWIPE_PRESET	64	
AUTO_ALARM_GOTO_PRESET	65	
WIPE_ON	66	
WIPE_OFF	67	
ON_SCREEN_DSIPLAY_TOGGLE	68	
WASH_START_PRESET	69	
WASH_FINISH_PRESET	70	
MULTI_ALARM_PRESET	50	// allow up to 12 alarms now.
FIND_END_STOPS	98	
SHOW_STARTUP_MESS	99	

### SPECIAL SETUP PRESETS

PICTURE_FLIP_MIRROR_ON_PRESET	188	
PICTURE_FLIP_MIRROR_OFF_PRESET	189	
TILT_REVERSE_ON_PRESET	190	
TILT_REVERSE_OFF_PRESET	191	
PHOTOCELL_IR_ON_PRESET	192	
PHOTOCELL_IR_OFF_PRESET	193	
PAN_REVERSE_ON_PRESET	194	
PAN_REVERSE_OFF_PRESET	195	
AUTO_IR_ON_PRESET	196	
AUTO_IR_OFF_PRESET	197	
INTERMITANT_WIPE_ON_PRESET	198	
INTERMITANT_WIPE_OFF_PRESET	199	//defines for limit setting presets
SOFTLIMIT_TOP_LEFT_PRESET	200	// Always lowest number
SOFTLIMIT_BOTTOM_RIGHT_PRESET	201	
NONDWELL_TOP_LEFT_PRESET	202	
NONDWELL_BOTTOM_RIGHT_PRESET	203	// Always highest number
AUTOHOME_PRESET1_PRESET	204	
AUTOHOME_SEQUENCE_PRESET	205	



		PRIVACY_SET_STYLE	229
AUTOHOME_OFF_PRESET	206	PRIVACY_SET_CENTRAL	228
MULTI_ALARM_ON_PRESET	207	PRIVACY_CLEAR_CENTRAL	227
MULTI_ALARM_OFF_PRESET	208	PRIVACY_SHOW_CURSOR	226
DIGITAL_ZOOM_DISABLE	209	PRIVACY_HIDE_CURSOR	225
DIGITAL_ZOOM_ENABLE	210	PRIVACY_SAVE_PARAMETER	224
SET_TOUR1_PRESET	211	PRIVACY_LOAD_PARAMETER	223
SET_TOUR6_PRESET	216	PRIVACY_INIT_PARAMETER	222
AUTOFLIP_ON_PRESET	217	PRIVACY_SET_CURSOR	221
AUTOFLIP_OFF_PRESET	218	AUTO_ALARM_ON_PRESET	236
WASHWIPE_ON_PRESET	219	AUTO_ALARM_OFF_PRESET	237
WASHWIPE_OFF_PRESET	220	AUTO_LOWLIGHT_ON_PRESET	238
PRIVACY_PRESET_START	221	AUTO_LOWLIGHT_OFF_PRESET	239
PRIVACY_PRESET_END	235	CAMERA_COMMAND_PRESET1	240
PRIVACY_SET_WHOLE	235	CAMERA_COMMAND_PRESET10	250
PRIVACY_CLEAR_WHOLE	234	CAMERA_RECALIBRATE_PRESET	251
PRIVACY_UNCOVER_ALL	233	RESET_PRESETS_PRESET	255
PRIVACY_REPLACE_ALL	232		
PRIVACY_SHOW_STYLE	231	<b>American Dynamics</b>	
PRIVACY_HIDE_STYLE	230	WASHWIPE_PRESET	52
		AUTO_ALARM_GOTO_PRESET	53



MULTI\_ALARM\_PRESET 28 // allow up to 12 alarms  
now. 28->40

## SPECIAL SETUP PRESETS

PAN\_REVERSE\_ON\_PRESET 54

PAN\_REVERSE\_OFF\_PRESET 55

AUTO\_IR\_ON\_PRESET 56

AUTO\_IR\_OFF\_PRESET 57

INTERMITANT\_WIPE\_ON\_PRESET 58

INTERMITANT\_WIPE\_OFF\_PRESET 59 //defines for limit setting  
presets

SOFTLIMIT\_TOP\_LEFT\_PRESET 60 // Always lowest number

SOFTLIMIT\_BOTTOM\_RIGHT\_PRESET 61

NONDWELL\_TOP\_LEFT\_PRESET 62

NONDWELL\_BOTTOM\_RIGHT\_PRESET 63 // Always highest number

AUTOHOME\_PRESET1\_PRESET 64

AUTOHOME\_SEQUENCE\_PRESET 65

AUTOHOME\_OFF\_PRESET 66

MULTI\_ALARM\_ON\_PRESET 67

MULTI\_ALARM\_OFF\_PRESET 68

DIGITAL\_ZOOM\_DISABLE 69

DIGITAL\_ZOOM\_ENABLE 70

SET\_TOUR1\_PRESET 71

SET\_TOUR6\_PRESET 76

AUTOFLIP\_ON\_PRESET 77

AUTOFLIP\_OFF\_PRESET 78

WASHWIPE\_ON\_PRESET 79

WASHWIPE\_OFF\_PRESET 80

PRIVACY\_PRESET\_START 81

PRIVACY\_PRESET\_END 95

PRIVACY\_SET\_WHOLE 95

PRIVACY\_CLEAR\_WHOLE 94

PRIVACY\_UNCOVER\_ALL 93

PRIVACY\_REPLACE\_ALL 92

PRIVACY\_SHOW\_STYLE 91

PRIVACY\_HIDE\_STYLE 90

PRIVACY\_SET\_STYLE 89

PRIVACY\_SET\_CENTRAL 88

PRIVACY\_CLEAR\_CENTRAL 87

PRIVACY\_SHOW\_CURSOR 86

PRIVACY\_HIDE\_CURSOR 85

PRIVACY\_SAVE\_PARAMETER 84



PRIVACY_LOAD_PARAMETER	83		WASHWIPE_PRESET	48	
PRIVACY_INIT_PARAMETER	82		AUTO_ALARM_GOTO_PRESET	49	
PRIVACY_SET_CURSOR	81		MULTI_ALARM_PRESET	57	// allow up to 12 alarms now.
AUTO_ALARM_ON_PRESET	46		PAN_REVERSE_ON_PRESET	56	
AUTO_ALARM_OFF_PRESET	47		PAN_REVERSE_OFF_PRESET	55	
AUTO_LOWLIGHT_ON_PRESET	48		AUTO_IR_OFF_PRESET	54	
AUTO_LOWLIGHT_OFF_PRESET	49		INTERMITANT_WIPE_ON_PRESET	53	
CAMERA_COMMAND_PRESET1	240		INTERMITANT_WIPE_OFF_PRESET	52	//defines for limit setting presets
CAMERA_COMMAND_PRESET10	250		SOFTLIMIT_TOP_LEFT_PRESET	48	// Always lowest number
CAMERA_RECALIBRATE_PRESET	50		SOFTLIMIT_BOTTOM_RIGHT_PRESET	49	
RESET_PRESETS_PRESET	51	// Normal Operation presets (Goto)	NONDWELL_TOP_LEFT_PRESET	50	
AD_WIPER	70		NONDWELL_BOTTOM_RIGHT_PRESET	51	// Always highest number
AD_WASHER	71		AUTOHOME_SEQUENCE_PRESET	47	
AD_LAMPS_ON	72		AUTOHOME_OFF_PRESET	46	
AD_LAMPS_OFF	73		MULTI_ALARM_ON_PRESET	45	
AD_OSD	74		MULTI_ALARM_OFF_PRESET	44	
<b>Kalatel</b>			DIGITAL_ZOOM_DISABLE	43	
LEFTAUTOPANLIMIT	62	//Don't change this part of Kalatel protocol	DIGITAL_ZOOM_ENABLE	42	
RIGHTAUTOPANLIMIT	63	//Don't change this part of Kalatel protocol	AUTOFLIP_ON_PRESET	41	



AUTOFLIP_OFF_PRESET	40	PRIVACY_REPLACE_ALL	232
WASHWIPE_ON_PRESET	39	PRIVACY_SHOW_STYLE	231
WASHWIPE_OFF_PRESET	38	PRIVACY_HIDE_STYLE	230
AUTO_ALARM_ON_PRESET	37	PRIVACY_SET_STYLE	229
AUTO_ALARM_OFF_PRESET	36	PRIVACY_SET_CENTRAL	228
AUTO_LOWLIGHT_OFF_PRESET	35	PRIVACY_CLEAR_CENTRAL	227
CAMERA_COMMAND_PRESET1	34	PRIVACY_SHOW_CURSOR	226
CAMERA_COMMAND_PRESET10	33	PRIVACY_HIDE_CURSOR	225
CAMERA_RECALIBRATE_PRESET	32	PRIVACY_SAVE_PARAMETER	224
RESET_PRESETS_PRESET	31	PRIVACY_LOAD_PARAMETER	223
	// Impossible to reach these presets	PRIVACY_INIT_PARAMETER	222
AUTOHOME_PRESET1_PRESET	204	PRIVACY_SET_CURSOR	221
SET_TOUR1_PRESET	211	AUTO_IR_ON_PRESET	196
SET_TOUR6_PRESET	216		
PRIVACY_PRESET_START	221	<b>Molynx</b>	
AUTO_LOWLIGHT_ON_PRESET	238	MULTI_ALARM_PRESET	24 //defines for limit setting presets
PRIVACY_PRESET_END	235	WASHWIPE_PRESET	32
PRIVACY_SET_WHOLE	235	AUTO_ALARM_GOTO_PRESET	33 //defines for limit setting presets
PRIVACY_CLEAR_WHOLE	234	AUTOHOME_PRESET1_PRESET	35
PRIVACY_UNCOVER_ALL	233	AUTOHOME_SEQUENCE_PRESET	36



		PRIVACY_PRESET_START	61 //221
AUTOHOME_OFF_PRESET	37	PRIVACY_PRESET_END	75 //235
INTERMITANT_WIPE_ON_PRESET	38	PRIVACY_SET_WHOLE	75 //235
INTERMITANT_WIPE_OFF_PRESET	39	PRIVACY_CLEAR_WHOLE	74 //234
SOFTLIMIT_TOP_LEFT_PRESET	40 //200	PRIVACY_UNCOVER_ALL	73 //233
SOFTLIMIT_BOTTOM_RIGHT_PRESET	41 //201	PRIVACY_REPLACE_ALL	72 //232
NONDWELL_TOP_LEFT_PRESET	42 //202	PRIVACY_SHOW_STYLE	71 //231
NONDWELL_BOTTOM_RIGHT_PRESET	43 //203	PRIVACY_HIDE_STYLE	70 //230
AUTO_IR_ON_PRESET	45	PRIVACY_SET_STYLE	69 //229
AUTO_IR_OFF_PRESET	46	PRIVACY_SET_CENTRAL	68 //228
MULTI_ALARM_ON_PRESET	47 //207	PRIVACY_CLEAR_CENTRAL	67 //227
MULTI_ALARM_OFF_PRESET	48 //208	PRIVACY_SHOW_CURSOR	66 //226
DIGITAL_ZOOM_DISABLE	49 //209	PRIVACY_HIDE_CURSOR	65 //225
DIGITAL_ZOOM_ENABLE	50 //210	PRIVACY_SAVE_PARAMETER	64 //224
SET_TOUR1_PRESET	51 //211	PRIVACY_LOAD_PARAMETER	63 //223
SET_TOUR6_PRESET	56 //216	PRIVACY_INIT_PARAMETER	62 //222
AUTOFLIP_ON_PRESET	57 //217	PRIVACY_SET_CURSOR	61 //221
AUTOFLIP_OFF_PRESET	58 //218	AUTO_ALARM_ON_PRESET	76 //236
WASHWIPE_ON_PRESET	59 //219	AUTO_ALARM_OFF_PRESET	77 //237
WASHWIPE_OFF_PRESET	60 //220	AUTO_LOWLIGHT_ON_PRESET	78 //238





AUTO_LOWLIGHT_OFF_PRESET	79 //239	RESET_PRESETS_PRESET	69	
CAMERA_COMMAND_PRESET1	80 //240	AUTOHOME_SEQUENCE_PRESET	68	
CAMERA_COMMAND_PRESET10	90 //250	CAMERA_RECALIBRATE_PRESET	67	
CAMERA_RECALIBRATE_PRESET	91 //251	DIGITAL_ZOOM_DISABLE	66	
ON_SCREEN_DISPLAY_ON_PRESET	92 //236	DIGITAL_ZOOM_ENABLE	65	
ON_SCREEN_DISPLAY_OFF_PRESET	93 //236	#define MENU_ON_OFF	63	//Don't change
INVERT_PRESET	94	MENU_ENTER	64	//Don't change
RESET_PRESETS_PRESET	95 //255	WASHWIPE_ON_PRESET	62	
FIND_END_STOPS	96	WASHWIPE_OFF_PRESET	61	
<b>Panasonic</b>		#define OSD_ON	60	
RELAY_TIME_START	252	PAN_REVERSE_ON_PRESET	59	
ALARM_SETTINGS_START	235 //16 modes	PAN_REVERSE_OFF_PRESET	58	
SET_TOUR1_PRESET	87	AUTO_IR_ON_PRESET	57	
SET_TOUR6_PRESET	92	AUTO_IR_OFF_PRESET	56	
CAMERA_COMMAND_PRESET1	76	AUTO_ALARM_ON_PRESET	55	
CAMERA_COMMAND_PRESET10	86	AUTO_ALARM_OFF_PRESET	54	
AUTOFLIP_ON_PRESET	73	MULTI_ALARM_ON_PRESET	53	
AUTOFLIP_OFF_PRESET	72	MULTI_ALARM_OFF_PRESET	52	
INTERMITANT_WIPE_ON_PRESET	71	AUTOHOME_OFF_PRESET	51	
INTERMITANT_WIPE_OFF_PRESET	70	AUTOHOME_PRESET1_PRESET	50	



AUTO_ALARM_GOTO_PRESET	49	PRIVACY_SET_CURSOR	31	
WASHWIPE_PRESET	48	SOFTLIMIT_TOP_LEFT_PRESET	27	// Always lowest number
AUTO_LOWLIGHT_ON_PRESET	47	SOFTLIMIT_BOTTOM_RIGHT_PRESET	28	
AUTO_LOWLIGHT_OFF_PRESET	46	NONDWELL_TOP_LEFT_PRESET	29	
PRIVACY_PRESET_START	31	NONDWELL_BOTTOM_RIGHT_PRESET	30	// Always highest number
PRIVACY_PRESET_END	45	MULTI_ALARM_PRESET	14	// allows up to 12 alarms now.
PRIVACY_SET_WHOLE	45			
PRIVACY_CLEAR_WHOLE	44			
PRIVACY_UNCOVER_ALL	43	<b>Bosch</b>		
PRIVACY_REPLACE_ALL	42	PRIVACY_PRESET_START	100	
PRIVACY_SHOW_STYLE	41	PRIVACY_PRESET_END	114	
PRIVACY_HIDE_STYLE	40	PRIVACY_SET_WHOLE	114	
PRIVACY_SET_STYLE	39	PRIVACY_CLEAR_WHOLE	113	
PRIVACY_SET_CENTRAL	38	PRIVACY_UNCOVER_ALL	112	
PRIVACY_CLEAR_CENTRAL	37	PRIVACY_REPLACE_ALL	111	
PRIVACY_SHOW_CURSOR	36	PRIVACY_SHOW_STYLE	110	
PRIVACY_HIDE_CURSOR	35	PRIVACY_HIDE_STYLE	109	
PRIVACY_SAVE_PARAMETER	34	PRIVACY_SET_STYLE	108	
PRIVACY_LOAD_PARAMETER	33	PRIVACY_SET_CENTRAL	107	
PRIVACY_INIT_PARAMETER	32	PRIVACY_CLEAR_CENTRAL	106	
		PRIVACY_SHOW_CURSOR	105	



PRIVACY_HIDE_CURSOR	104		NONDWELL_TOP_LEFT_PRESET	97	
PRIVACY_SAVE_PARAMETER	103		NONDWELL_BOTTOM_RIGHT_PRESET	98	// Always highest number
PRIVACY_LOAD_PARAMETER	102		RESET_PRESETS_PRESET	99	
PRIVACY_INIT_PARAMETER	101				
PRIVACY_SET_CURSOR	100				
FIND_END_STOPS	115				
//AUTO_ALARM_ON_PRESET	236				
//AUTO_ALARM_OFF_PRESET	237				
//AUTO_LOWLIGHT_ON_PRESET	238				
//AUTO_LOWLIGHT_OFF_PRESET	239				
//CAMERA_COMMAND_PRESET1	240				
//CAMERA_COMMAND_PRESET10	250				
MULTI_ALARM_PRESET	// 35,36,37,38,39,40,41,42				
WASHWIPE_PRESET	47				
AUTOHOME_PRESET	48				
AUTO_ALARM_GOTO_PRESET	49				
AUX1_PRESET	50				
AUX26_PRESET	97	//defines for limit setting presets			
SOFTLIMIT_TOP_LEFT_PRESET	95	// Always lowest number			
SOFTLIMIT_BOTTOM_RIGHT_PRESET	96				
			<b>Forward Vision</b>		
			WASHWIPE_PRESET	62	
			AUTO_ALARM_GOTO_PRESET	63	
			MULTI_ALARM_PRESET	50	// allow up to 12 alarms
			FIND_END_STOPS	98	
			SHOW_STARTUP_MESS	99	
			<b>SPECIAL SETUP PRESETS</b>		
			PICTURE_FLIP_MIRROR_ON_PRESET	188	
			PICTURE_FLIP_MIRROR_OFF_PRESET	189	
			TILT_REVERSE_ON_PRESET	190	
			TILT_REVERSE_OFF_PRESET	191	
			PHOTOCELL_IR_OFF_PRESET	193	
			PAN_REVERSE_ON_PRESET	194	
			PAN_REVERSE_OFF_PRESET	195	
			AUTO_IR_ON_PRESET	196	
			AUTO_IR_OFF_PRESET	197	



INTERMITANT_WIPE_ON_PRESET	198		PRIVACY_PRESET_START	221
INTERMITANT_WIPE_OFF_PRESET	199		PRIVACY_PRESET_END	235
SOFTLIMIT_TOP_LEFT_PRESET	200	// Always lowest number //defines for limit setting presets	PRIVACY_SET_WHOLE	235
			PRIVACY_CLEAR_WHOLE	234
SOFTLIMIT_BOTTOM_RIGHT_PRESET	201		PRIVACY_UNCOVER_ALL	233
NONDWELL_TOP_LEFT_PRESET	202		PRIVACY_REPLACE_ALL	232
NONDWELL_BOTTOM_RIGHT_PRESET	203	// Always highest number	PRIVACY_SHOW_STYLE	231
AUTOHOME_PRESET1_PRESET	204		PRIVACY_HIDE_STYLE	230
AUTOHOME_SEQUENCE_PRESET	205		PRIVACY_SET_STYLE	229
AUTOHOME_OFF_PRESET	206		PRIVACY_SET_CENTRAL	228
MULTI_ALARM_ON_PRESET	207		PRIVACY_CLEAR_CENTRAL	227
MULTI_ALARM_OFF_PRESET	208		PRIVACY_SHOW_CURSOR	226
DIGITAL_ZOOM_DISABLE	209		PRIVACY_HIDE_CURSOR	225
DIGITAL_ZOOM_ENABLE	210		PRIVACY_SAVE_PARAMETER	224
SET_TOUR1_PRESET	211		PRIVACY_LOAD_PARAMETER	223
SET_TOUR6_PRESET	216		PRIVACY_INIT_PARAMETER	222
AUTOFLIP_ON_PRESET	217		PRIVACY_SET_CURSOR	221
AUTOFLIP_OFF_PRESET	218		AUTO_ALARM_ON_PRESET	236
WASHWIPE_ON_PRESET	219		AUTO_ALARM_OFF_PRESET	237
WASHWIPE_OFF_PRESET	220		AUTO_LOWLIGHT_ON_PRESET	238



AUTO_LOWLIGHT_OFF_PRESET	239		PRIVACY_UNCOVER_ALL	93
CAMERA_COMMAND_PRESET1	240		PRIVACY_REPLACE_ALL	92
CAMERA_COMMAND_PRESET10	250		PRIVACY_SHOW_STYLE	91
CAMERA_RECALIBRATE_PRESET	251		PRIVACY_HIDE_STYLE	90
RESET_PRESETS_PRESET	255		PRIVACY_SET_STYLE	89
<b>VCL</b>			PRIVACY_SET_CENTRAL	88
MULTI_ALARM_PRESET	50	// allow up to 12 alarms now.	PRIVACY_CLEAR_CENTRAL	87
WASHWIPE_PRESET	62		PRIVACY_SHOW_CURSOR	86
AUTO_ALARM_GOTO_PRESET	63		PRIVACY_HIDE_CURSOR	85
DM_PRESETS	64		PRIVACY_SAVE_PARAMETER	84
NORMAL_PRESETS	65		PRIVACY_LOAD_PARAMETER	83
FIND_END_STOPS	66		PRIVACY_INIT_PARAMETER	82
PICTURE_FLIP_MIRROR_ON_PRESET	69		PRIVACY_SET_CURSOR	81
PICTURE_FLIP_MIRROR_OFF_PRESET	70		WASHWIPE_ON_PRESET	101
TILT_REVERSE_ON_PRESET	71		WASHWIPE_OFF_PRESET	102
TILT_REVERSE_OFF_PRESET	72	//defines for limit setting presets	DIGITAL_ZOOM_ON_PRESET	103
PRIVACY_PRESET_START	81		DIGITAL_ZOOM_OFF_PRESET	104
PRIVACY_PRESET_END	95		SET_9600_BAUD_PRESET	105
PRIVACY_SET_WHOLE	95		SET_1200_BAUD_PRESET	106
PRIVACY_CLEAR_WHOLE	94		AUTO_IR_ON_PRESET	107



AUTO_IR_OFF_PRESET	108	CAMERA_COMMAND_PRESET1	240	//not used in VCL version
MULTI_ALARM_ON_PRESET	109	CAMERA_COMMAND_PRESET10	250	
MULTI_ALARM_OFF_PRESET	110			
PAN_TILT_SCALE_ON_PRESET	111	<b>Vicon</b>		
PAN_TILT_SCALE_OFF_PRESET	112	PRIVACY_PRESET_START	35	//vcl keyboard does this, but baxall doesn't!
CAMERA_OFF_PRESET	113	PRIVACY_PRESET_END	49	
CAMERA_ON_PRESET	114	PRIVACY_SET_WHOLE	49	
AUTO_ALARM_ON_PRESET	115	PRIVACY_CLEAR_WHOLE	48	
AUTO_ALARM_OFF_PRESET	116	PRIVACY_UNCOVER_ALL	47	
PAN_REVERSE_PRESET	117	PRIVACY_REPLACE_ALL	46	// swaps left/right
IR_MODE_ON_PRESET	118	PRIVACY_SHOW_STYLE	45	// for keyboards without lamps button
IR_MODE_OFF_PRESET	119	PRIVACY_HIDE_STYLE	44	
SOFTLIMIT_TOP_LEFT_PRESET	120	PRIVACY_SET_STYLE	43	// Always lowest number
SOFTLIMIT_BOTTOM_RIGHT_PRESET	121	PRIVACY_SET_CENTRAL	42	
NONDWELL_TOP_LEFT_PRESET	122	PRIVACY_CLEAR_CENTRAL	41	
NONDWELL_BOTTOM_RIGHT_PRESET	123	PRIVACY_SHOW_CURSOR	40	// Always highest number
AUTO_LOWLIGHT_ON_PRESET	124	PRIVACY_HIDE_CURSOR	39	
AUTO_LOWLIGHT_OFF_PRESET	125	PRIVACY_SAVE_PARAMETER	38	
ADDRESS_CHANGE_PRESET	126	PRIVACY_LOAD_PARAMETER	37	
RESET_PRESETS_PRESET	127	PRIVACY_INIT_PARAMETER	36	
		PRIVACY_SET_CURSOR	35	



			SOFTLIMIT_BOTTOM_RIGHT_PRESET	91	
MULTI_ALARM_PRESET	50	// allow up to 12 alarms now.	NONDWELL_TOP_LEFT_PRESET	92	
AUTO_IR_ON_PRESET	69		NONDWELL_BOTTOM_RIGHT_PRESET	93	// Always highest number
AUTO_IR_OFF_PRESET	70		RESET_PRESETS_PRESET	94	
MULTI_ALARM_ON_PRESET	71		REVERSE_PAN_PRESET	95	
MULTI_ALARM_OFF_PRESET	72		REVERSE_TILT_PRESET	96	
AUTO_ALARM_ON_PRESET	73		REVERSE_IMAGE_PRESET	97	
AUTO_ALARM_OFF_PRESET	74		SET_ADDRESS_PRESET	99	
AUTO_ALARM_GOTO_PRESET	50		PRIVACY_SETUP_BYTE1	101	
BAUD_TOGGLE_PRESET	75		PRIVACY_SETUP_BYTE2	102	
WASHER_PRESET	76		AUTOHOME_PRESET1_PRESET	103	
WIPER_CONT_PRESET	77		AUTOHOME_SEQUENCE_PRESET	104	
WIPER_INT5_PRESET	78		AUTOHOME_OFF_PRESET	105	
WIPER_INT30_PRESET	79		MOTOR_PARAMS_BYTE_1	106	
STORE_SEQUENCE_PRESET	80		MOTOR_PARAMS_BYTE_2	107	
DELETE_SEQUENCE_PRESET	81		FIND_END_STOPS	108	
CLEAR_SEQUENCE_PRESET	82				
SET_SEQUENCE_DWELL_PRESET	83				
START_SEQUENCE_PRESET	88	//defines for limit setting presets // Always lowest number			
SOFTLIMIT_TOP_LEFT_PRESET	90				





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## Notes

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